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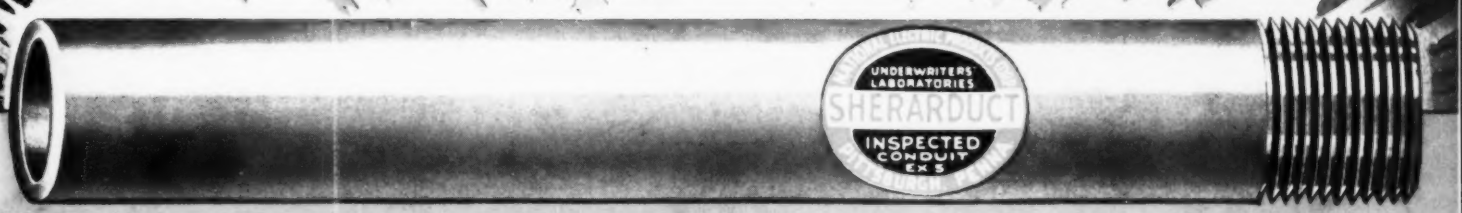

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VOLUME 33
NUMBER 4

electrical contracting

WITH WHICH IS CONSOLIDATED ELECTRICAL RECORD

S. B. WILLIAMS, EDITOR AND GENERAL MANAGER

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BRANCH SALES OFFICES IN ALL PRINCIPAL CITIES

Reinspection

ELSEWHERE in this issue will be found some fresh data on reinspection that is significant.

One inspector in Portland, Ore., in nineteen months sold to owners the correction of defective wiring to the extent of over $50,000 worth of work. This shows first that despite hard times the necessity for correcting defective wiring CAN BE SOLD. It also shows that a good inspector could make a fine living selling the correction of defective wiring on a 10 per cent basis.

Another significant fact was revealed in a study of reinspection in New York City. The percentage of the number of equipments (single meter installations) reinspected and found defective was nearly constant until after the depression set in when it began to mount rapidly. Also the number of electrical fires in that city is increasing.

CONSIDERABLE interest has been developing of late in reinspection because of the opportunity it offers for business at the present time. Plans are being discussed in a number of places and in all probability more activity of this nature will be seen before the year is over.

Before reinspection can take its proper place as a major builder of wiring business, however, the several branches of the electrical industry must be sold on what it means to them individually and collectively. Inspection departments can do just about so much; but they cannot be expected to carry the entire load. In the first place, there is not enough in it for them to get unduly excited. In fact, with the wave of economy that is sweeping over municipal governments it is going to take a powerful lot of selling in many instances to get any men to make reinspections.

If reinspection is to make any real progress it must be sold to the public and that means all that selling implies.

In the first place there are two kinds of premises—public and private. It is not difficult to gain admittance into the former because people are working there. In the latter, i.e., the home, it is not so easy for an inspector to get in. The public is just a little scary of the stranger who wants to inspect something.

A publicity program, therefore, is necessary before any program of reinspection can be launched. This publicity will probably cost time and money and should be taken care of by the electrical industry. Pamphlets, news items, addresses before civic, business and social bodies, displays, advertisements—all of these are necessary to any well organized program.

THERE seems to be some opposition to such a program because it might scare people and then they might not use electric service.

It is not necessary in the right kind of propaganda to present horrors to the public, but at the same time it is not necessary to hesitate to state that electricity is dangerous.

The public is used to being sold safety measures. All that the public wants with its caution is the remedy, be it tire chains for wet pavements or reinspection for defective wiring.

At the same time there is more that can be sold the public besides safety through reinspection. Correction of defects can provide better operation of factories, fewer shut-downs and less spoilage; it can provide more light for the same money; it can save on light and power bills.

Let us study the several approaches to the sale of reinspection and let us sell ourselves on what it means to us. There is a market here—a vast market—which can be sold provided the industry is behind it.

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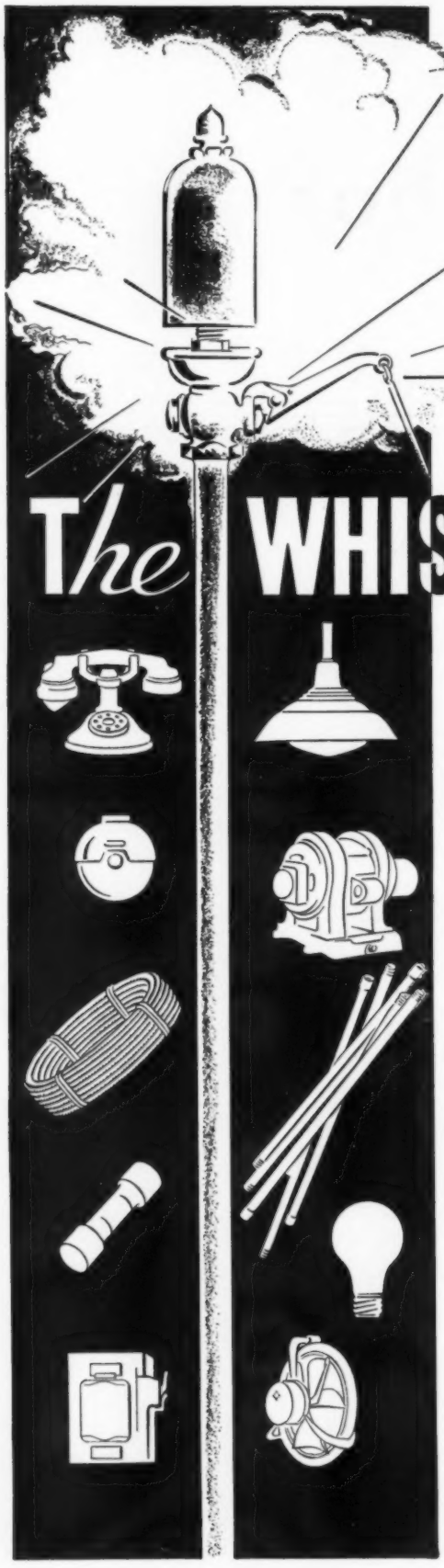

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VOLUME 33
NUMBER 4

electrical contracting

FEBRUARY
1934

WITH WHICH IS CONSOLIDATED ELECTRICAL RECORD

CROW BAIT

A young naturalist was sent out to bring in a flock of live crows, to be used for study by a museum. He hadn't the faintest idea how to snare them, and while he was singing the blues in a country hotel a farmer heard him. "Live crows ain't to be snatched out o' your hat, mister," said the local man, "But I reckon I can fix you up, at $2.00 a head, F. O. B. cornfield. Be at my place at daybreak tomorrow, and I'll show samples."

The naturalist was new to the Frank Buck stuff, and had little faith, but, after a sleepless night, he drove out and met the farmer. As soon as they reached the timber, they heard a yammering that sounded like all the crows in Arkansas.

At the farmer's direction, the naturalist peeked out at the edge of a cornfield and saw a strange sight. Staked to the ground was a big stuffed owl, surrounded by about 10 crows, all flapping around him and cursing like dock rats. Suddenly the farmer yanked a cord, a big net slashed down, and four crows were captured. The farmer then explained that crows hate an owl worse than anything living, adding: "All you need for any game or fish, mister, is the right kind of bait."

Although the public has long since been sold on using electricity, it has been literally lulled to sleep on the safety question. Not only the contractors, but electrical men generally, have hesitated to wave the red flag of danger in educating users against faulty wiring.

Partly because we disliked being accused of having an axe to grind, and partly because we thought the truth would scare away business, the soft pedal has been clamped on the danger angle at every turn. It is time, however, to back up the positive arguments of comfort and convenience with a vigorous reinspection campaign to root out defective and bootleg wiring.

The answer is in increased co-operation between the contractors and the inspectors. The latter are not only willing, but exceptionally able to furnish plenty of the good old stuffed-owl bait, in the form of reports and information on unsafe wiring. Thus armed, it should not be hard for the allies to promote among the owners, careless and otherwise, the safety of electricity when properly installed and inspected.

BY JOHN WISE

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Independent Code for Electrical Contractors Gets Hearing

ACCEDING to the request of the National Electrical Contractors Association, General Johnson has permitted the electrical construction industry to file with NRA a code of fair competition independent of the rest of the construction industry. Previously the electrical construction code had been considered only as supplemental to a basic code for the entire construction industry. Because of objections on the part of organized labor this basic code had not received the President's signature.

An open hearing on the independent code was held by Deputy Administrator Value in Washington on January 22 at which a large number of local associations as well as the national were represented and heard.

The independent code differs from the supplemental codes previously filed and amended principally with respect to administration and labor provisions.

The area agreement plan for setting up standards for wages, hours and conditions of employment is retained. Such area agreements are to be arrived at by collective bargaining by truly representative associations or groups of employers and employees after proper notice and hearing. To investigate any complaints of non-compliance with any provisions of an area agreement once approved by the President, NRA shall set up in each such area a board, the members of which are to be selected from nominations made by the local employers and employees. There shall be two representatives for each group, the four to select an impartial fifth who shall be chairman.

Where there are no area agreements (a) the minimum wage for skilled workers is set at 75 cents per hour and unskilled workers at 40 cents; (b) the maximum hours are limited to 40 hours per week and 8 hours in any 24-hour period except in emergencies where time and a half shall be paid for such overtime; (c) the number of helpers is limited on any job to not more than one to three skilled workers.

To administer the code a Code Authority is provided for which shall consist of ten members, seven to be members of the National Electrical Contractors Association and three others, all to be appointed by the executive committee of the N.E.C.A. Any interested person may make a complaint to the Code Authority and secure a prompt hearing. Provision is made for appeal to NRA from the Code Authority findings.

The rules of fair competition are very largely the same in intent as those previously published. Bid peddling and bid shopping are prohibited. Rules for bidding require that on work exceeding $250, or such lesser amount as may be decided locally, sealed copies of all bids must be filed with a depository which shall be some bank or trust company approved by the Code Authority. These filed copies are to be opened and tabulated by the local committee after the work has been awarded. Investigation will be made by a committee of review of three non-bidders.

In the definitions of the members of the industry and the work coming under this code, the only exceptions made were for telephone and telegraph and power company operations

Many Local Associations Were Represented at Hearing

on their own systems and outside the customers' premises. The telephone interests objected on the grounds that work by them on customers' premises had never been done by the electrical contractors except for the installation of conduit and in some instances the pulling of cables.

After the hearing a meeting was held by the code committee with telephone representatives and a modification made to recognize this situation.

The light and power industry requested that a change be made in the exception relating to its operations to permit emergency and test work being done on customers' premises by power company representatives and this change was agreeable to all parties.

L. E. Mayer, president N.E.C.A. and chairman of the code committee, in submitting the independent code related the history of the industry's effort so far to obtain a code and stated that the code as presented represented complete accord with the I.B.E.W.

This code was submitted by mail to the industry and a poll taken, the results of which were submitted by L. W. Davis, general manager of the association. A total of 3,393 signed certificates of endorsement were received up to the time of the hearing. These certificates came from over 450 cities and towns in 45 states. In addition there were filed with the administrator over 35 letters and resolutions from local associations and groups representing an additional 600 electrical contractors supporting the code. Mr. Davis stated that over 70 per cent of the employing contractors representing more than 70 per cent of the industry's volume of business had endorsed the code.

There then followed representatives of a large number of associations of electrical contractors and individuals voicing their endorsement of the code and requesting its early approval. They were as follows:

A. Lincoln Bush, representing the New York State Association of Electrical Contractors and Dealers, Association of Electrical Contractors of New York City, Electric Club of Brooklyn, Contractors Group of Electrical Association of New York and the Independent Electrical Contractors Association of New York.

John L. Flagg, president of and representing the New York Electrical Contractors Association.

Alfred J. Hixon, representing the Boston Electrical Contractors Association, Inc.

John G. Livingston, president J. Livingston Company, New York City.

Willis W. Clark, representing the large contractors of Cleveland.

H. B. Frazier, representing the Philadelphia Contractors' Association.

T. W. Wilmer, president of and representing the Institute of Electrical Contractors of Richmond, Va.

Fred Rossiter, president of and representing the Northern New Jersey Electrical Contractors' Association.

C. D. Williams, president of and representing the Electrical Contractors' Association of Richmond, Va.

R. W. Walker, secretary of the Southeastern Industrial Chapter, N. E.C.A., asked permission to file a brief. This brief was later filed, objecting to the 1 to 3 ratio of helpers on the grounds that it is at variance with present practice in sections where labor is unorganized and that it cannot be enforced with industrial plants employing their own electricians. Since this latter group is the greatest competitor of the industrial contractor the Southeastern Industrial Chapter asked for a modification of the rule to a 1 to 1 ratio unless it could be made mandatory upon all employers of electricians to perform in accordance with the helper clause.

Attorneys for the National Industrial Service Association opposed the inclusion of motor repair shops under the electrical construction industry code. They were asked to consult with the N.E.C.A. code committee. Such a meeting took place after the hearing. After the conference the N.E.C.A. code committee reported to the Administrator that it did not approve of the request of the National Industrial Service Association for a separate code.

Representatives of the National Manufacturers Association and seventy-one other industrial associations

On Independent Code for Electrical Construction Industry

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and the Machinery and Allied Products Institute, a federation of fifty-seven trade associations, appeared in opposition to the inclusion of electrical installation, maintenance, or servicing work in factories when done by their own organization, whether for their own use or for inclusion in their own products.

The I.B.E.W. appeared in complete support of the code as presented. In its brief it supported the 1 to 3 helper ratio and pointed out the necessity for including work of factory electricians within the code.

The hearing was adjourned to January 31 when the administrator would announce whether a further hearing would be necessary.

The N.E.C.A. code committee reports that it has been in conference with the deputy administrator and with various groups which have presented opposing briefs, and that progress is being made in clearing up points in dispute or in submitting to NRA the committee's answer to such opposition. The committee hopes that through this means any necessity for a further hearing will be obviated.

Measuring Loads With Watt-Hour Meter

By E. M. McLaughlin
Electrical Inspector, Richmond, Cal.

THAT a load can be measured accurately, quickly and conveniently by timing a service watt-hour meter disc, is a point generally overlooked by those electrical men such as engineers, inspectors and motor men to whom such quick information would many times be highly desirable. It is a mistaken idea that this timing and converting from disc revolutions to watts can not be made except by one who has had extensive meter testing experience, for the most practical trouble shooter can memorize the few figures and calculations necessary.

The disc of a watt-hour meter rotates at a speed proportional to the load in watts which is drawn through it. If we were familiar enough with a meter to know that a certain load would cause a certain disc speed, it should be an easy matter to calculate a load at a certain other speed. Information as to the amount of load which will cause the disc to make one revolution in one hour is the key to the situation, for it would be only necessary to count the revolutions for one hour to find the unknown load by comparison of speeds. For example, if it is known that a load of 1 watt will cause the disc to make one revolution in an hour and if, upon timing the disc, it is found to make 100 revolutions, the load then will be 100 watts. This watt-hour meter would then be said to have a watt-hour constant of 1 watt-hour. It is then necessary to know only the watt-hour constant of the meter in order to check any load.

It is not practical, of course, to time a disc for one hour; the revolutions made in one minute, multiplied by 60, will give accurate results. For example, a General Electric watt-hour meter with a disc constant of .3 was found to rotate at a speed of 20 revolutions per minute. What was the load in watts? Solution:

$$.3 \times 20 \times 60 = 360 \text{ watts.}$$

While different meter manufacturers build their watt-hour meters with different watt-hour constants, each manufacturer constructs most of his a.c. watt-hour meters using a basic watt-hour constant. This basic constant is usually assigned to the smallest standard meter put out by this manufacturer and other sizes and models have watt-hour constants which have the same ratio to this basic constant as their volt-ampere rating has to the 5 amp. 110-volt size. As the smallest standard watt-hour meter commonly manufactured is the 5-amp., 110 (100) volt, single-phase type, this size will have the basic disc constant. Other capacities will have proportional constants. For example, a 5-amp. 100-volt, single-phase, Westinghouse watt-hour meter has a constant of ⅓ watt-hour. Therefore, a 10-amp., 100-volt has a constant of 2/3, a 5-amp., 200-volt has a constant of 2/3, a 10-amp., 200-volt a constant of 4/3 or 1⅓. A General Electric single-phase watt-hour meter of 5-amp., 110-volt capacity has a basic constant of .3 watt-hour. Therefore, a 10-amp., 110-volt type has a constant of .6; and, a 20-amp., 110-volt, a constant of 1.2 watt-hour.

This ratio between watt-hour constants applies also to the effective watt-hour constant for larger meter installations where the use of current and potential transformers are involved. For example, a Westinghouse, single-phase, watt-hour meter used with potential coils for 2200 volts and current coils for 50 amp., will have a watt-hour constant of:

⅓ for the meter itself (5-amp. 100-volt) times 20 for the potential transformation, times 10 for the current transformation, or, ⅓ × 20 × 10, or 66⅔ watt-hours per revolution of the disc.

Polyphase meter watt-hour constants can also be approximated from this basic 5-amp., 110-volt, single-phase constant. The standard two and three-phase meter is essentially two single-phase meter elements acting on one shaft. Therefore the constant will be twice that of a single-phase instrument of similar voltage and current rating. If, in the above 2200-volt meter installation, the meter was metering three or two-phase power, the watt-hour constant would be twice 66⅔ or 133⅓.

Three wire 110-220 volt single-phase watt-hour meters usually have a constant identical to the 220-volt meter of like current capacity.

Usually, in any one district, possibly not over two or three watt-hour meters of different manufacture, will be encountered. It will be a fairly simple matter to memorize the watt-hour constants used by these manufacturers. As an aid in this, the following manufacturers' basic characteristic watt-hour constants are given:

General Electric, 60 cycle, single-phase—.3 watt-hours per revolution of the disc.

Westinghouse, 60 cycle, single-phase—⅓ watt-hours per revolution of the disc.

Duncan, 60 cycle, single-phase—.25 watt-hours per revolution of the disc.

Sangamo, 60 cycle, single-phase—5/24 watt-hours per revolution of the disc.

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Re-inspection dropped after creating over

$50,000 of Electrical Work in 19 Months

By Henry W. Young

MOST appreciated are the things which we have once had and which have been taken away from us. Portland, Ore., is in that position right now, in relation to systematic reinspection of electrical wiring. It was one of the first cities to pass a reinspection ordinance, about twelve years ago. Beginning January 1, 1932, a deputy electrical inspector, J. F. Gray, was assigned wholly to reinspection work by Chief Electrical Inspector L. W. Going. For nineteen months, until August 1, 1933, he pursued the work vigorously and intelligently, and the results were outstanding.

Then came a belated, and for that reason more ruthless economy program on the part of the city, and despite the fact that the reinspection activity was partly self-supporting, and was creating thousands of dollars' worth of work for electrical contractors and their men, it was suspended last August, and the date of its resumption is uncertain.

In the September, 1932, issue of ELECTRICAL CONTRACTING, there appeared an article giving the results of the first six months' operation of reinspection work in this city. We now have them for the first nineteen months, or until the activity was suspended. They appear in the table on this page. Over $50,000 worth of electrical wiring jobs were produced for electrical contractors by a single inspector, during the worst part of the depression; hundreds of premises were cleaned up, electrically, and hazards to life and property reduced to a minimum. This one man did his own field work, made up his own reports and kept his own office records. Furthermore, during the nineteen months while he was at work, almost every owner of a business was in a precarious financial condition. In many cases it would have been imprudent to arbitrarily force them to make expensive changes in wiring. Rather, it was wise to do a selling job, rather than a police job, and the inspector required only those changes that were absolutely necessary to make the installations reasonably safe, until times should get better.

Results of Re-inspection in Portland, Ore.
Jan. 1, 1932, to Aug. 1, 1933

*Number of Buildings	117
Number of Permits Issued	511
Value of resulting Wiring Jobs	**$50,574**
Average per Permit	99
Fees Collected	532
Average Fee per Permit	$1.04

*The number of buildings inspected does not coincide with the number of premises inspected, since one building may have a large number of tenants individually responsible.

In connection with the above table, it should be remembered that reinspection work was actively begun, with one man assigned to it, on January 1, 1932. He started from scratch. When he was taken off the work, August 1 of the next year, after nineteen months, he had a great many inspections under way in various stages of completion, but which were not far enough along to determine the value of the wiring job or to collect the fee. If these were cleared up and added to the above total it is probable that the full results of his reinspection work would be nearer $60,000 in actual wiring jobs.

Contrast this inspector's work with what it might have been in good times, when all had money, had the work called for been more elaborate and up to first-class standards, and had less time been spent on arguing and coaxing, and more on condemning that which was obviously long past its usefulness and unsafe in the extreme. The benefits to the electrical contracting industry would then be still more evident.

Mr. Going's department has been cut from nine men to five, which precludes all reinspection and represents a force barely enough to take care of new permits issued on the basis of 1933. It also eliminates all stock inspection.

"Local branches of the electrical industry were not backward in presenting conditions to the city commissioner," said Mr. Going. "In a brief which was presented, it was pointed out that they believed this move would be a decidedly backward step. Manifestly, it would be impossible for the electrical division to even follow up the complaints of dangerous wiring originating in the fire marshall's office and others, averaging about a thousand a year. Pages and pages of sound argument on the value and necessity of reinspection were presented. But it seems that the best arguments bow down before that all-powerful one—'No Money.'

"I am of the opinion," continued Mr. Going, "that there are several reasons for the comparatively backward position of inspectional work in

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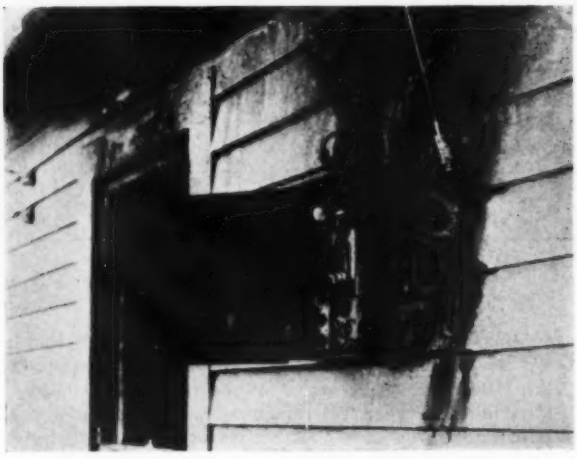


A Condition Frequently Encountered: It is often the practice to make armored cable extensions from existing ungrounded service cabinets. As this cable is many times grounded to the water piping system, it acts as a grounding conductor for the service conduit. In the event of a break-down between the service conductors and conduit, the armor is called upon to carry the entire load, becomes hot and melts before the protective fuse nearest back can act. That is what happened here.

(Upper left) The break-down was here—failure and fusing of service conductor to metal at inner (pipe) end of fitting.

(Upper right) Excess of current carried over armor to ground (water pipe) due to non-code grounding. This armored cable extension made to original knob and tube installations, portions of which show.

(Lower left) Another place where the cable overheated. Fire started at rear and below this cut-out box.

city administration. The worst obstacle is the fact that the results are not susceptible of measurement. As inspection work increases in effectiveness, its results are less conspicuous. A formerly sympathetic public gradually begins to consider it a bother over something that is no longer objectionable, in spite of the fact that results are assured only by sustained effort.

"In our efforts in the past to secure the necessary means to carry on reinspection work, we have continually emphasized the following six points as showing who the principal beneficiaries of reinspection really are:

"(1) The users of electric current, because of more adequate installation and a consequent decrease in electrical trouble of all sorts, as well as a decreased loss of energy due to unnecessary heating of poor contacts, insufficient capacity in bus bars, mains, sub-feeders and circuits.

"(2) The fire and accident insurance companies, because of the reduction of electrical hazards and a decreased number of fires and accidents from electrical causes.

"(3) The manufacturer of electrical appliances, because new materials and devices will be substituted for the worn out and dangerous equipment now in use.

"(4) The public at large, because of the reduction in the blanket rate of fire insurance.

"(5) The electrical contractor and wireman, because of the new wiring for old equipment and the replacement of old, worn-out and defective installations.

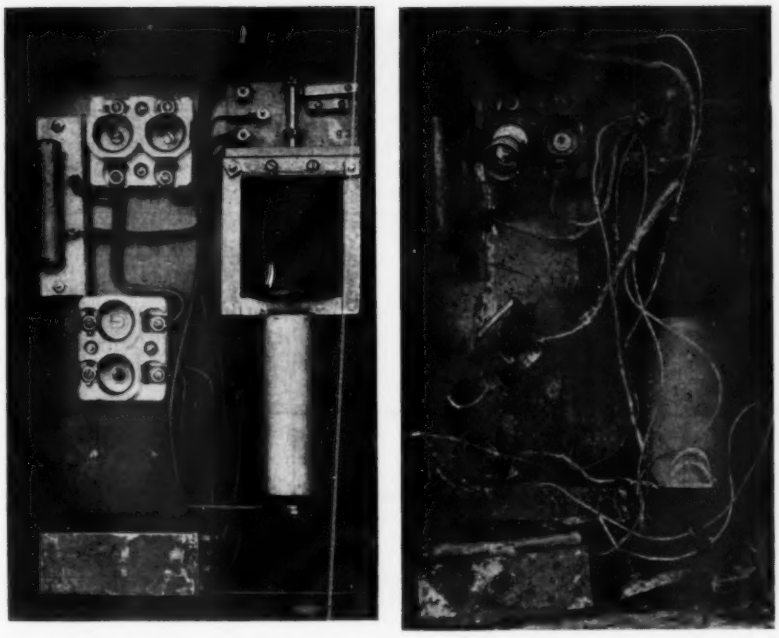
"(6) The utilities, because of decreased number of trouble and service calls, which means better operation from the standpoint of equipment connected to their lines, and consequently more satisfied customers."

The reinspection ordinance, No. 41449, authorizing the employment of an inspector for reinspecting the inner fire district, was passed by the city council on July 19, 1922, although such a man was not employed full time on this work until the first of 1932, as stated. This ordinance reads in part as follows:

An Ordinance authorizing the Commissioner of Public Works to employ an additional deputy electrical inspector, and declaring an emergency. WHEREAS, it has come to the notice of the Commissioner of Public Works that in a great number of cases of additional electrical installations are being made without permits and which may endanger life and be a fire hazard and

WHEREAS, it has been determined by a special committee of the Council consisting of the Commissioner of Public Affairs and Commissioner of Public Works that an additional deputy electrical inspector will be required to adequately handle the work of reinspecting the installations of electrical work, etc.

The need of this ordinance was first brought about by the electrocution of one of the city's firemen while fighting a fire in a basement containing defective wiring. This wiring was installed without a permit, and consequently without inspection. The ordinance was later amended in July, 1926, by ordinance No. 49788, which is known as the Electrical Code. The Code requires that a systematic reinspection of wiring be made in the



(Left) Sign flasher (an unlisted type) Contacts stuck. Ignited. (Right) What was left of the sign flasher. Resultant fire caused $500 damage.

inner fire district at least every two years.

In view of the splendid results that have been shown in this city in the few months that reinspection was actively carried on, it would seem that nothing but the exigencies of a great depression could have caused its, even temporary, discontinuance. And on this depression phase of the matter, Chief Inspector Going has this to say:

"In certain services, there is ample basis for reducing personnel. The decline in building activity has lessened the work of those engaged in building construction inspection, and unless such inspectors undertake more frequent inspection or reinspection of completed structures, there is, of course, no excuse for retaining them on the municipal payroll. Ideally, they should not be dismissed until all possibility for their useful employment in the department have been exhausted. Other inspections, however, do not fluctuate with general business conditions. In most instances more inspection is desirable in times of depression, owing to the tendency on the part of building owners and managements to allow their electrical equipment to deteriorate. Also keen competition leads to more cheap bootleg wiring, since, when it becomes common knowledge that the personnel of the department has been reduced, there will be an increase in the number of installations made without permits."

Reinspection Shows Increasing Number of Defective Installations

THE electrical contractor's stake in systematic reinspection of electrical equipments in New York City has long been recognized. Severe curtailment of new construction, cutting sharply into his usual sources of business, has emphasized the importance of jobs in old buildings where run-down electrical wiring and equipment, or defective initial installations are waiting to be corrected. It has been authoritatively estimated that there are at least 100,000 such jobs needing attention in New York City today.

In New York no municipal agency engages in electrical reinspection. But for the past decade extensive reinspection has been undertaken by the New York Board of Fire Underwriters. Data so secured brings to light the high percentage of defective equipments in the premises inspected showing the volume of rehabilitation business possible for the contractor.

Because the Underwriters have been interested merely in gathering information for rate adjustments and penalizations, figures significant to the electrical contractor have never been segregated and published. An interpretation for the contractor of the reinspection record for the past eleven years is therefore made here:

Table I shows the number of "existing equipments," (i. e., no new installations included) reinspected for the years 1923-33. By "equipments," is meant a single metered job, of which there may be many in one building. These reinspections were made with an average frequency of about once every three years for each equipment.

During the first seven years, it will be noted, the percentage of equipments reinspected and found defective was approximately 60 per cent. Starting with 1930, however, the percentage has leaped upwards reaching 78 per cent in 1933. While no reason is given by the records for this increase in defective wiring during these years, it is significant that the

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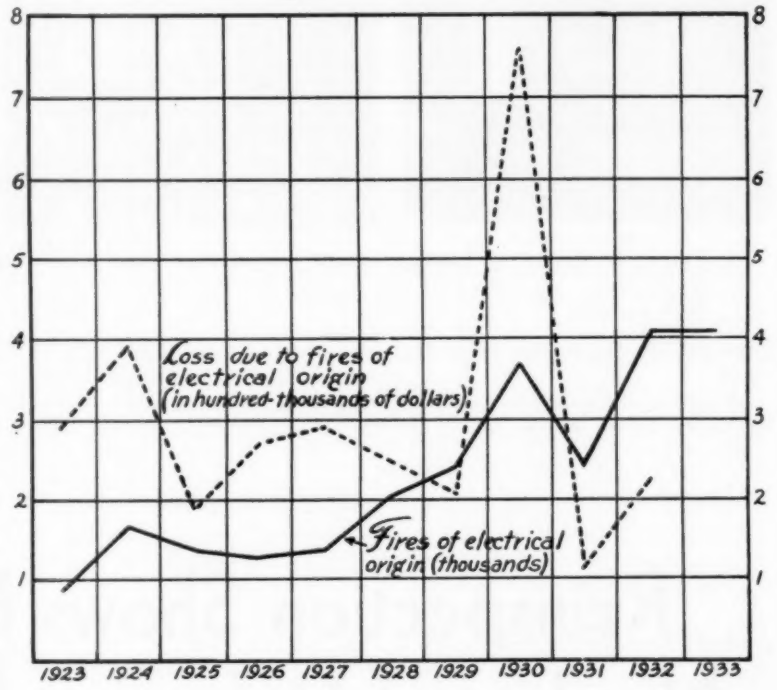
Table I. Re-Inspection of Existing Equipments, New York City

	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Buildings completely reinspected...	2,254	4,042	3,737	4,248	4,547	4,970	6,281	9,195	8,032	15,487	19,222
Equipments completely reinspected.	8,298	13,974	11,719	11,529	11,475	18,489	19,931	27,792	16,683	27,041	26,356
Equipments found defective.....	4,474	8,379	6,985	6,588	6,973	10,368	12,037	18,513	12,167	20,506	20,404
Equipments found satisfactory.....	3,824	5,595	4,734	4,941	4,502	8,121	7,894	9,279	4,516	6,535	5,852
Percentage found defective.....	54%	60%	60%	57%	60%	56%	60%	67%	73%	76%	78%

increase occurred during the depression. If the rise in bootleg wiring during the depression has been the cause of this increase in the amount of defective wiring found on reinspection then all estimates of the amount of defective wiring needing correction must be increased considerably. The increase in number of defective equipments in New York has been more than one-quarter more.

Beyond offering recommendations, the Board makes no "follow-ups" to see that defective equipments are promptly improved, a fact which emphasizes the need for aggressive business tactics on the part of the contractor. The Board's action is merely to pass its findings along to the Underwriters' rate-setting authority, which in turn, after the insured has been penalized, takes no further action until the latter having corrected the defect, petitions for his old rates.

Table II gives data concerning the number and cost of fires definitely traced to an electrical origin for the same eleven-year period. They should form impressive material for a rehabilitation campaign on the part of electrical contractors. Additional data available for the years 1931 and 1932 tell what percentage of the losses for those years are "directly chargeable to improper maintenance of electrical apparatus or to alterations and extensions made without the knowledge and approval" of the Board. Corresponding to the two losses given for those years—$116,208, and $225,693—these charges are respectively $99,839 and $212,168. Of course, all of the fires were due to defective equipments—but the fact that relatively small portions of the losses were due to equipments that had been previously bulletined as satisfactory indicates the savings possible through a systematic reinspection service properly followed up by corrective measures.



The Number of Electrical Fires is Increasnig

The accompanying curve shows the definite upward trend in the number of fires of electrical origin while the losses, except for the year 1930, have not materially altered. In other words, the number of defective wiring installations is increasing. With quick detection these fires can be confined to small losses. On the other hand, the situation in 1930, when the aggregate loss more than doubled the average of the preceding five years, is one that may come more frequently as the opportunity grows with the number of defective installations.

A similar story is told by the average loss from electrical fires as shown in Table II. With so many fires of very small loss it is apparent that there are many of considerable proportions.

In Table III an interesting breakdown is made of the electrical fires for 1932—the latest data available. Of a total of $225,693 there was attributed to appliances $43,431 or between 19 and 20 per cent. Thus over

Table II. Electrical Fires, New York City*

	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932
Lumber Fires	344	727	803	545	772	1,015	1,026	992	923	1,101
Total Loss.....	$290,835	$387,549	$190,450	$267,521	$288,421	$254,705	$211,154	$759,244	$116,208	$225,693
Average Loss per fire	$868	$533	$237	$490	$374	$251	$206	$765	$126	$205

*1933 not available.

80 per cent of New York's 1932 electrical fires occurred from causes most of which might have been prevented had the work been brought up to present code standards.

Now this Underwriter's record of reinspections over the last eleven years obviuosly shows that a great deal of latent business is waiting for the electrical contractor in New York City. What has he been doing about it?

Until recently it seemed that no joint effort to get this business could be made by the city's various electrical contractors' associations. They have always been numerous, and their interests have often conflicted. However, in March, 1933, under the leadership of A. Lincoln Bush, chairman, New York State Association of Electrical Contractors and Dealers, twelve contractors' associations in New York City formed a Council with two men from each association as representatives. The principal functions of the new body were to improve conditions relative to licensing, inspection, and reinspection.

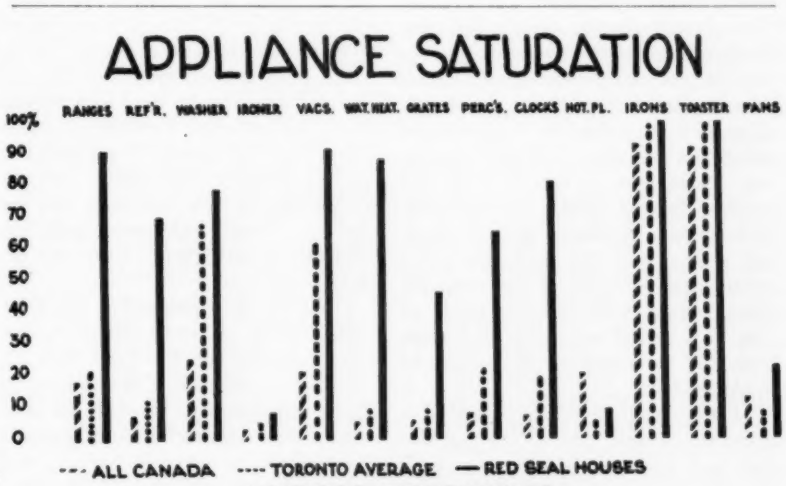
A trained field man of many years experience in electrical contracting was employed, and his services were supplemented by volunteer workers. A check-up of licenses and a survey of electrical installations were then begun. Hundreds of reinspections of properties have been made since the Council was organized, and much work for the contractors has been developed from them.

This program has been carried on by the members of the various associations belonging to the Council. They report to their secretary who in turn communicates the information to the field man where the violations were found to exist. After these have been surveyed, where entree is possible, they are reported to the Department of Water Supply, Gas and Electricity and to the New York Board of Fire Underwriters, whose inspectors make a thorough investigation. In the case of the Underwriters, if the work is not corrected, it results in increased cost of insurance. The municipal department also insists upon corrections. If they are not made after a set time, service is suspended.

The work accomplished during the past year by the Council of Contractors' Associations, with the co-operation of the Department of Water Supply, Gas, and Electricity and the New York Board of Fire Underwriters, has encouraged the associations to develop plans for a complete survey and re-inspection of installations in the City of New York.

Table III. Electrical Fires for the Year 1932, New York City

	FIRES	LOSS
Contacts defective	17	$4,243.00
Conductors in conduit	6	1,208.38
Conductors in gutter space	33	5,955.00
Conductors exposed to moisture	23	133.00
Current entering building over the service conduit or other pipes thence to interior ground connection	27	1,555.00
Heating of the armor of interior cables	34	2,968.00
Disturbance in rear of elevator panels	12	4,136.00
Fuse operation and Bridging	8	253.00
Flexible cord: Used on chain fixtures	6	118.00
Used on floor lamps and hand portables	22	2,834.00
Used for circuit work	68	11,620.00
Used on pressing irons (asbestos type)	3	.....
Heaters: Portable luminous type	21	11,732.00
Portable non-luminous	3	682.00
Electric pressing irons	160	19,507.00
Other Types of Heaters	12	2,951.00
Lamps: Heat igniting adjacent flammable material	29	2,975.94
Heat igniting rubber covered wires at outlet	12	960.00
Fracture of glass globe	6	47,994.00
In Flower Basket	1	200.00
Motion Picture Film: Ignition	13	2,581.00
Motors and Generators: Disturbance in winding	86	5,036.90
Motor generator in closet	1	181.00
Motor sparks	11	529.00
Panel Board Disturbance	4	2,005.00
Domestic refrigeration	121	4,195.00
Radio: Receiving sets	60	8,559.00
Services of Illuminating Co.: Overhead	3	102.00
Underground	5	.....
Short circuits: Accidental	33	2,393.00
Elevator cables	13	1,600.00
Sockets, receptacles and switches	19	825.00
Splices at outlets	100	24,919.00
Christmas tree sets	25	3,979.00
Electrically operated toys	2	501.00
In other equipment	34	6,632.00
Signs: Incandescent lamp type	5	275.00
Gas filled glass tube type	8	851.00
Transformer in vaults	19	900.00
Bell ringing transformer	1	10.00
Disturbance in Power House Equipments	4	32,500.00
Disturbance in Reactor Control	1	1,000.00
Volatile liquids: Ignition in spray hoods	9	1,931.00
Ignition of varnish remover	8	802.00
Ignition of hat cleaner fluid	9	751.00
Ignition of gasoline	1	10.00
In Mattress Factory	3	600.00



Effect of Red Seal Wiring on Appliance Sales in Toronto

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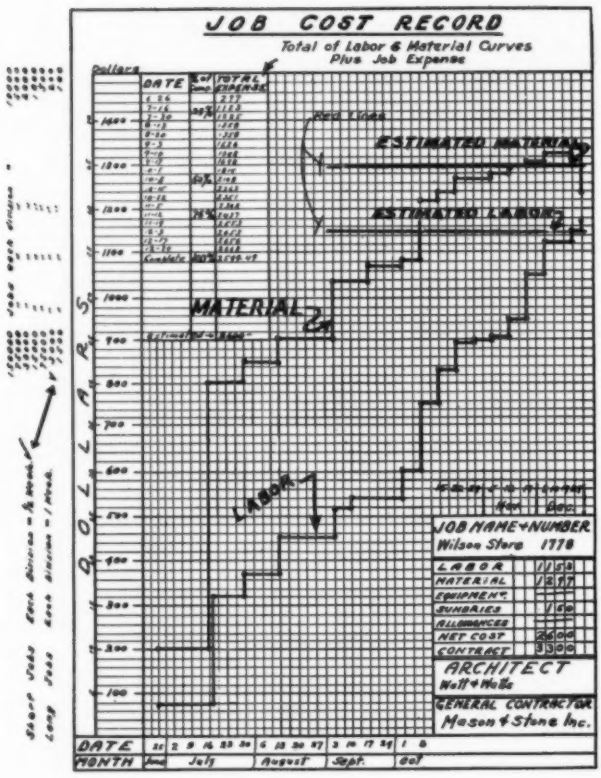
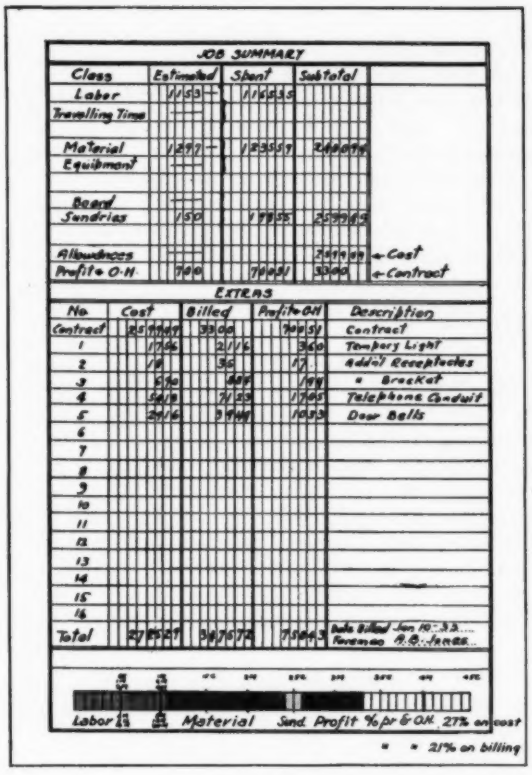


Form No. 1



Form No. 2

Job Cost Records

By Lionel G. Gale
Chief Electrical Engineer, James Wilkinson & Co.
Boston, Mass.

IT is generally conceded that no contractor can estimate intelligently, unless he keeps an accurate record of job costs.

It should also be recognized that the tendency of the average superintendent; is to watch closely those jobs that have been taken in competition at a close margin of profit and overhead; and to neglect to, some extent, those jobs on which there is a good estimated profit. This sometimes results in the good job showing a loss, and the poor job going considerably ahead. If the same attention was given to both types of jobs, it is logical to assume that more than the estimated profit would be made on both.

If the superintendent, weekly, is given the current cost of labor, material, and job expense; he can check directly the proportion of the job cost with that percentage of the job completed.

To enable him to see this relation graphically, an hour each week spent plotting the job costs on a chart similar to Form No. 1, would be decidedly worth while. These forms have been in use for several years. Form No. 2 gives a complete record of the job, and may also be used as a record of the job foreman's efficiency. The forms may be printed separately or on two sides of one sheet. At the completion of the job they can be filed for future reference, and for comparison with future estimates on similar jobs.

The method of procedure, should a contractor be so fortunate as to get a job, should be: (FORM No. 1)

1. From estimate sheet fill:—job name and number, the various cost items; the architect's, and general contractor's or owner's names, and estimated total cost at foot of "total expense" column.

2. Determine from the table in the left margin, the time value for each vertical division, and the dollar value of each horizontal division. Fill in the figures for these items.

3. Draw red lines horizontally to represent the allowable upper limits of the labor and material curves.

4. Each week, plot the labor and material cost curves, and fill in "total expense" column with date, estimated percentage of completion, and total expense to date.

Finally, fill in Form No. 2, and compare estimated cost with actual; list the total contract and all extras; and figure gross profit and the percentage of profit to the cost and billing.

The forms used to illustrate this article are not perfect, but do serve to indicate the advantage of the graphic chart. Using these as a guide any contractor interested, can design his own forms to suit his particular business.

Explosion Proof Wiring—V

Electrical Installations in Class III and IV Hazardous Locations

By C. W. Gustafson,
Chairman, Article 32 Committee, N.E.C.

IN the rules of Article 32 for Class III and Class IV locations we are dealing with locations where easily ignitible fibres or materials producing combustible flyings are present. In Class III have been placed those locations where such materials are manufactured or used, in other words, locations involving manufacturing or processing operations. Class IV rules relate to warehouses used for the storage of combustible fibres and not involving manufacturing or processing operations. While many of the rules are identical for the two classes there are several special situations in Class IV locations which warrant individual rules and, rather than causing confusion by attempting to treat both types of occupancies as a single class, two sets of rules, each complete in itself, were developed.

Easily ignitible combustible fibres have proved to be decidedly hazardous materials due to the ease of ignition and the speed at which flames spread through them. When a fibrous material, such as cotton, is distributed in the form of lint or "flyings" in a thin film over machinery and building members, a fire proceeds with almost explosive rapidity through the entire room. Such fires are usually called "flash fires" and have been the origin of tremendous disasters.

When fibres are compressed into bales and wrapped with burlap the apparent hazard would seem to be reduced. However, in baled storage there is usually sufficient loose lint protruding from the bales to permit travel of fire over the surface with amazing speed. Very often smouldering fires are left in individual bales after the primary flash fire and these are difficult to extinguish. Many vicious fires have occurred in large terminal cotton warehouses, especially in those of less modern construction where the warehouses are of several acres in extent without fire cut-off partitions. Large property values are usually present which makes the prevention of fire, including special care in the selection and installation of electrical equipment, decidedly important.

In manufacturing operations involving combustible fibres, such as in the opening and picking departments of cotton mills, in mattress factories, and in upholstery establishments, the primary hazard is somewhat increased because the materials are handled in light, loose form offering ample surface for ignition and combustion. However, the amount of material present and exposed is usually considerably less than in terminal warehouses, and, therefore, the actual property loss is somewhat smaller.

In either case it should be kept in mind that these combustible fibres may be easily ignited by electric arcs or sparks, by the heated filament from a broken incandescent lamp, or even by the heat from an unenclosed lamp or resistor.

Of the easily ignitible combustible fibres encountered in commerce the following are representative:

Cotton
Sisal or Henequen
Coco fibre or Coir
Tow
Ixtle or Istle
Excelsior
Jute
Spanish Moss
Oakum
Kapok
Cotton Waste and Linters
Hemp

Under some conditions of poor housekeeping or inadequate waste disposal methods it may be necessary to include in this class combustible light materials such as paper cuttings, wood shavings and coated papers. These, while comparatively easily ignitible, are not to be considered as hazardous as the fibres listed above because the production of lint and "flyings" is not involved. Animal fibres, such as wool and silk, are not usually regarded as of the easily ignitible class.

Typical Locations

As in the classes previously discussed, the presence and extent of the hazardous area depends to a large extent on the arrangement of buildings, the method of handling the fibres, the type of machinery, and the degree of housekeeping maintained. However, in the following an attempt will be made to name the more common Class III and Class IV locations with the added warning that each particular plant be judged somewhat on its own merits.

Cotton Gins. The Class III hazardous areas are represented by the seed cotton house, the gin building, the cleaning building if any, and the cotton seed houses. Buildings such as the power house, office and shop buildings are exempt.

Cotton Compresses. Establishments of this type are commonly associated with cotton warehouses and, therefore, are usually required to be regarded as Class IV locations.

Cotton Mills. In this general class

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are placed mills producing cloth, bagging, hosiery, and similar goods. As a rule the hazards involved diminish as the process proceeds from the raw materials to the finished. The opener room where the bales of cotton are opened, the picker room, the carding room, the dust bins and the cotton compartments or bins are to be regarded as Class III locations. In some types of processes where excessive quantities of flyings are produced, the hazardous area may extend into the spinning and weaving departments, especially in the vicinity of machines. In the case of the larger mills where considerable baled cotton may be stored in warehouses, such warehouses should be considered as Class IV locations.

Cotton Seed Oil Mills. The hazardous areas in this type of plants include the seed house, the seed cleaning and delinting rooms, and the linter baling department. These should be regarded as Class III locations. If the linter storage is of any considerable extent this department should be regarded as a Class IV location, but if the amount stored is small it is permissible to regard it as a Class III location.

Upholstery Establishments. These may represent departments in furniture factories, automobile works, casket factories, and others where a considerable volume of upholstery work is done. Generally the Class III hazardous area includes the opener and picker room, and the immediate area about the points where the material is handled in loose form. The fibre storage rooms should be regarded in Class III or Class IV locations depending on the amount stored.

Mattress Factories. Establishments of this type involve the handling of loose cotton or other combustible fibres and as a result all parts of the plant up to the point where the ticking is sewed should be regarded as Class III locations.

Combustible Fibre Warehouses. The Class IV hazardous area extends throughout, including covered loading docks and runways. Cut-off sections used for non-hazardous purposes such as offices, shops, and similar areas are exempt. Warehouses of this class may be of the terminal type or may be associated with cotton mills, artificial silk factories, pyroxylin and explosives factories, and others where large quantities of fibres are stored.

Apparatus

The rules for both Class III and Class IV locations have the common purpose of prescribing types of apparatus and wiring which will, first, prevent the ignition of lint and similar materials by arcs or sparks occurring in their immediate vicinity, and, second, will guard against the ignition of such substances through overheating of apparatus such as lamps, motors, and the like because of accumulations of lint on or in them.

It will be found that the rules for both classes, require, in general, that the cases enclosing arcing contacts, lamps, and similar apparatus be dust tight although the materials involved are usually of a linty nature. It was felt that this requirement was necessary because there is a considerable variation in the degree of fineness of the lints, some approaching that of a dust. It has been found that the ordinary so-called "dust proof" enclosures or cases were not sufficiently tight to adequately exclude lint, especially in the more hazardous locations. Furthermore, these comparatively lightly built enclosures cannot be depended upon to retain in them sparks or heated metal which might occur even in normal operation.

Underwriters' Laboratories have not drawn standards for apparatus intended specifically for Class III or Class IV locations it being felt that equipment listed for Class II locations was suitable. This stand is concurred in by electrical manufacturers and by Article 32 Committee and is generally accepted by inspection authorities.

The rules for Class IV locations are somewhat more stringent than those for Class III. This is partly because of the large values and extensive areas involved in the former and partly for the reason that any small spark or heated metal may ignite the lint protruding from the bales. In passing it might be well to call attention to the fact that the Class IV rules have the approval of the National Fire Protection Association committee on Combustible Fibre Storage and therefore uniform enforcement may be expected.

With this introduction we may now proceed to discuss the intent and application of the specific rules of the two classes. Reference will be made frequently to the discussion of the rules for Class II locations which appeared in the preceding chapter of this series. This is done to avoid unnecessary repetition.

The type of wiring for both classes is limited to rigid conduit with the same qualifications as were discussed in our treatment of rules for Class II locations.

Service Equipment, Panelboards, and Switchboards

The requirements for this type of apparatus are identical with those for Class II locations so detailed comment will not be needed at this point. It should be emphasized, however, that every effort be made to locate the service equipment and distribution centers outside of the hazardous areas. This can usually be more readily done in the case of lint than when dust is involved, because lint does not have such a marked tendency to diffuse through an area as does dust.

Fuses and circuit breakers should be located outside of the hazardous area whenever practicable. When this cannot be conveniently done they are required to be installed in the manner detailed under the same subject in the discussion of the rules for Class II locations.

Motors

For Class III locations, motors having brushes or sliding contacts shall: (1) be of the totally enclosed, fan cooled, or totally enclosed pipe ventilated, or (2) be enclosed in separate rooms or housings, or (3) have brushes or sliding contacts enclosed in substantial tight metal housings.

The separate rooms or housings referred to in the foregoing relates to motor enclosures of the type described in our discussion on the rules for Class II locations. Of the alternatives mentioned the first should always be given preference as this provides for the guarding of the entire motor.

In certain Class III locations where lint and flyings may be present in excessive quantities, such as in some cotton gins or in the seed cleaning and linter rooms of cotton seed oil mills, it is required that the motors be of one of the totally enclosed types or be located in a separate fire retardant room or enclosure. In reasonably clean locations of the Class III designation open squirrel-cage motors may be used but the enclosed types are always to be recommended.

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The rules for Class IV locations definitely require that all motors regardless of type be of one of the totally enclosed types or be located in a separate fire retardant room. This means that even motors on cranes, electric trucks, and similar equipment must be so designed or guarded.

Obviously, motors placed in power houses or similar non-hazardous locations are subject only to the general provisions of the Code as given in Article 10.

Motor Controllers, Protective Devices, Switches, and Resistors

Motor controllers, overload protective devices, switches, and resistance devices should whenever practicable be located in a fire resistant room or in a non-hazardous location. In general, the same comments as given in our discussion of Class II rules apply. For resistance devices installed in Class IV locations it is required that, in addition to being enclosed in dust tight cases, the cases be so designed as to prevent ignition of lint or flyings by direct contact with the case whether the device is in normal operation or in event of accident. This may be accomplished by providing a second enclosing case over the first, thus reducing surface temperatures.

Heating Appliances

Heating appliances are required to be of a type approved for installation in locations where combustible flyings or lint are present. Normally, heating is not required in the hazardous area itself except in the case of manufacturing plants. In the majority of such instances steam or hot air heat is available, thus making the use of electrical heating appliances unnecessary. To our knowledge no electric heating appliances for Class III or Class IV locations have yet been developed.

Lighting Equipment

For Class III locations fixed lamps, so located or exposed that there is a possibility of flyings or lint collecting on them, are required to be enclosed in globes of the dust tight type, and, further, if the lamps are exposed to mechanical injury they shall be provided with substantial guards. Pendant lamps are permitted in such locations under the same conditions as discussed under Class II rules.

In Class IV locations lighting fixtures must be wired with not less than No. 14 wire and the fixture wiring must be enclosed in rigid conduit or its equivalent in thickness as protection against injury and to guard against the emission of sparks in event of burn out. Lamps may be in receptacles attached directly to outlet boxes but in any case they are not to be installed where they are likely to be injured when bales are tiered or handled. To obtain some protection from such injury, lamps should be installed between beams rather than on them. It is also required for Class IV locations that all fixed lamps and their sockets be so enclosed that in event of burn out or breakage of the lamp or socket no spark or hot metal can escape from the enclosure. This requirement can be met by use of dust tight enclosing globes and substantial guards or by affixing wire glass over the bell of the reflector of the unit. It will be seen that the effect of these rules is to prohibit the use of cord pendants for Class IV locations.

As in Class II locations the use of portable lamps should be discouraged for they are hazardous even at their best. When they must be used they are required to be of the dust tight guarded type. Cords for portable lights and other portable appliances and the plugs and receptacles used with them are identical with those specified for Class II locations.

Electric Cranes

The rules for Class IV locations contain requirements regarding the safeguarding of cranes and their auxiliaries. These are important for the reason that sparks dropping from the collectors of a trolley type crane to baled cotton below may cause a disastrous fire. When cranes are of the trolley type they must be operated on an ungrounded system in order that accidental grounds in windings or circuits may be detected without delay. Such detection of accidental grounds is then possible by use of a recording ground detector in the feeder circuit, operating in conjunction with a relay which automatically causes the opening of the feeder circuit breaker should the insulation resistance of the system fall below 1000 ohms. A protective system of this type is operating satisfactorily in a large terminal cotton warehouse in New Orleans. By occasionally inspecting the tape of the recorder the operator can detect any decrease in insulation resistance and make the necessary repairs before more serious trouble occurs.

More than usual care should be taken in the design of moving current collectors of the crane in order to reduce sparking, but as further precaution non-combustible barriers must be provided under the collectors to prevent the escape of sparks or hot particles.

Where the distance of travel of the crane is comparatively short it is often practicable to supply current to the crane through a flexible cable equipped with an approved reel or take-up device. Cables used with cranes of this kind shall be Type S or Type PA.

Battery Charging Equipment

In cotton warehouses storage battery trucks are often used, thus necessitating equipment for charging their batteries. This equipment is required to be located in an outside building of non-hazardous occupancy or in a separate fire resistant room in the warehouse, built so as to exclude flyings or lint. This room must be well ventilated so as to permit the escape of gases generated during the charging process. Placing or removing batteries in or from trucks must be done only in this room and not out in the warehouse proper.

Grounding

The grounding of the non-current-carrying parts of equipment in Class III and Class IV locations is equally as important as in other hazardous locations. This must be done in a permanent and effectual manner and therefore close adherence to the rules is advised. Dependence on the locknut and bushing type of contact is not permitted, bonding jumpers or other approved means being required to insure an effective and permanent grounding circuit. Reference should be made to the discussion of this subject under the rules for Class II locations.

In the foregoing the important features of the rules for Class III and Class IV locations have been discussed. This article completes the analysis of types of hazardous locations and wiring required. The next and final installment will appear in the March issue and will be devoted to answering some of the questions most frequently asked pertaining to Article 32.

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electrical contracting

With which is consolidated Electrical Record

S. B. WILLIAMS, Editor

THE CONTRACTORS' CODE

THERE is much to be gained through unity of action with others but sometimes such unity brings with it the loss of benefits that can be gained only through individual effort. Such a condition has prevailed in the attempt of the construction industry to secure a basic code.

The electrical construction industry drafted its first NRA code last June at a meeting in Chicago and in so doing called in the resident vice-president of the I.B.E.W. for consultation on matters affecting labor. At the same time the committee, by long distance telephone, communicated with the Washington headquarters of labor.

The whole NRA movement, however, was too new for labor to commit itself, but the fact remains that the electrical construction industry did not ignore organized labor in drafting its original code.

The N.E.C.A. which undertook the drafting of this code was not permitted to file independently because NRA desired to consider the construction industry as a whole. Accordingly, the electrical construction code was filed as supplemental to the basic construction code—and then the fun began.

From the time of the first hearing early in September until now the construction industry and labor have not been able to compose their differences and although a basic code has gone to the President, it must be apparent, since he has not signed it, that he is not satisfied with it.

In the meantime, the N.E.C.A. and the I.B.E.W., being unwilling to sit by and see nothing done, through conferences of executives and code committees, came to a mutually satisfactory agreement and asked permission to file an independent code.

This request was granted by General Johnson and a public hearing held in Washington on January 22. Some objections were filed but, of course, nothing definite was intimated by the administration.

If one can go by precedent, it would seem that with employers and labor in accord a code might be approved. On the other hand, the mere permission to file an independent code and secure a hearing thereon is not to be taken as any indication that the administration and the President have reached a decision to sign independent codes.

On the whole, however, the chances of getting a code seem brighter today than they have at any time in the past.

SENSIBLE COOPERATION

IN the territory served by the Associated Gas & Electric Company out of its Syracuse office every contractor will soon be cooking by electricity. The power company is of the opinion that no man can enthusiastically push electric ranges unless he uses one.

Accordingly the utility has offered every contractor an electric range at wholesale, to be paid for out of profits on jobs furnished by the power company.

What a sensible way of creating cooperation!

ESTIMATING AT A COST OF 34 PERCENT

A SURVEY conducted during the month of November last by the Electrical Contractors' Association of Northern California revealed that $279,355 worth of electrical work was submitted for competitive bidding. Of this amount $26,027, or less than 10 percent, was actually contracted.

The combined estimates of all electrical bidders for this work was $1,778,141 for labor and materials alone. The cost of estimating, of course, is not a fixed amount but on the average it is doubtful if it will fall below one-half of one percent of labor and material and in all probability will run higher.

If that figure, however, is taken, it will be seen that the cost to the San Francisco contractors to estimate the above work was at least $8,890. Since only $26,027 was contracted for, this cost represents over 34 percent for estimating.

The contractors who got the work might feel that their estimating overhead was not nearly as high but if we assume a fair divi-

sion of the work it is apparent that for every job secured there were plenty that were figured by each contractor that he did not get. All of these costs must be charged against the work secured.

Of course, these conditions are greatly aggravated by the prevailing low volume of business. On the other hand, much of the work for which bids are asked is very tentative and there is very little sincere purpose behind the request for bids.

Since architects and general builders took exception to the quantity survey bureaus as preventing the securing of competitive prices, might not some plan be worked out whereby bids will be made only upon payment of a fee, said fee to be returned provided the work was let within a certain definite period?

NEW PRODUCTS

MORE new electrical products are being announced right now by manufacturers than has been the case for some time. A very large percentage of these products have been designed for industrial application.

Undoubtedly these new products are intended to build sales because of their superior features, economical performance, etc. Do they not also offer an opportunity to the electrical contractor?

FILLING STATION REINSPECTION

FOLLOWING a serious gasoline filling station explosion 417 gasoline pumps in Madison, Wis., were reinspected and not more than ten of them complied with the wiring regulations of the National Electrical Code.

Most of these installations undoubtedly were made prior to the inclusion of Article 32 in the Code. Nevertheless, the record shows that even though the work may not have violated the Code at the time it was installed, a serious hazard exists.

Here, it seems to us, is a real opportunity for reinspection to perform a service both to the public and to the owner. With the facts at hand the inspector should have little difficulty convincing an owner of the advisability of rewiring in accordance with present Code standards.

The series on explosion-proof wiring now appearing in this magazine should be of considerable help to the inspectors in this connection.

COSTLY ECONOMIES

IN Portland, Ore., and Denver, Colo., the municipal administrations have made certain economies which look very much as though they were going to cost more than the saving effected.

For nineteen months the Portland electrical department employed one electrical inspector on reinspection in large buildings. In that time he uncovered a large quantity of dangerously defective wiring, the correction of which he did not attempt to enforce but rather to sell to owners. More than $50,000 worth of electrical work resulted.

At the most modest estimates this work provided over 1,000 man hours of labor per month. Expressed in another way, this work provided continuous employment for eight men at 30 hours a week.

Is it an economy for any city to stop the work of a man who is providing continuous employment for eight others, let alone the business created for contractors, dealers, wholesalers and manufacturers?

In Denver the electrical department to keep busy had been making reinspections and as a result the department showed a profit. One man has just been dropped and the estimated loss in revenue to the city as a result is $1,000. Is that good economy?

In both cities the electrical industry had made strong protest but the protest has not been heeded.

It is our opinion, however, that the matter should not be allowed to stop there. These men on reinspection are digging up business for the contractor and through him for the wholesaler and manufacturer. If these cities will not spend the money for this work the electrical industry should find some way to finance it.

We doubt very much if these cities would object to the employment of these men provided more revenue were to result from their work. If the cities should continue adamant in their policy of non-employment perhaps the industry could undertake to employ these men. In other words, the work of reinspection is too valuable to the electrical industry, particularly at this time, to permit it to stop just because of some wave of economy at the city hall.

The electrical contractors, wholesalers and manufacturers' representatives of Portland and Denver have an opportunity not only to help themselves, but also to point the way to other communities that have not engaged in reinspection. Will they do it?

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\\\ code chats ///

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE

CONDUCTED BY F. N. M. SQUIRES
CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

DIFFERENCE BETWEEN A.C. AND D.C. GROUNDS

902-a states that 2-wire D.C. systems of not over 300 volts between wires shall be grounded on one conductor at the supply station, but not at the individual services.

Does this mean the service wire is not to be grounded inside of any building, and if so, why is this different than A.C. systems?

D.C. supply systems of not over 300 volts to ground are to be grounded only at the supply station or stations, but never at the individual services. This is because it has been found that the flow of direct current over water pipes causes rapid deterioration of the water pipe and its connections due to electrolysis. A.C. does not do this.

MULTIPLE GROUNDING

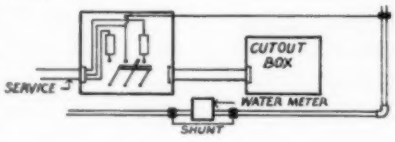
901-e (fine print), states, "It is recommended that single electrode ground connections when installed, and periodically afterwards, be tested for resistance, particularly when multiple grounding to water pipe is not used."

What is meant by "when multiple grounding to water pipe is not used"? That is, how is this multiple grounding done?

This is a recommendation that the connection between the grounding conductor and the water piping be tested for resistance and especially so when a transformer supplies an individual service in which case the neutral conductor would not be grounded at a number of services but only at the one service and possibly at the transformer. The "multiple grounds" here refer to a number or multiplicity of grounds at a number of services supplied by the secondary system.

GROUNDING CONDITIONS

Would it be permissible to ground the service wire to the nearest water pipe as shown below, instead of running it direct to the street side of water meter? 908-d seems to allow this.



Where possible and where not too long a grounding conductor is necessary, the grounding conductor should be attached to the water pipe at a point on the street side of the water meter. But where a long run would be necessary 908-d permits the grounding conductor to be attached to the water pipe at a point near the service equipment and then requires that meters and unions, etc., be bonded by suitable jumpers.

SEPARATE GROUNDING CONDUCTOR

What is meant in 906-c (1931 Code) by a separate grounding wire to ground equipment?

This means a conductor other than the metal enclosure or covering for conductors or grounding wire run with the circuit conductors in wire assemblies as mentioned in 906-(b). In other words, a wire run separately from anything else.

INTERVAL GROUNDING OF SYSTEM GROUNDS

901-f states, "Where a system ground conductor or secondary neutral grid is used, it shall be grounded at intervals."

Has it not been the rule that where a service wire was grounded at the service switch, or when any metal job was grounded, it was only necessary to ground it one place?

This rule refers to the supply system and provides that a neutral grid or a secondary ground conductor be grounded at intervals throughout the supply system before it reaches the individual services.

Within any building, the neutral conductor should be grounded only at the service point and not elsewhere inside of the building.

EMERGENCY LIGHTING SYSTEMS

I have been a constant reader of your "Code Chats" in ELECTRICAL CONTRACTING, *but have never seen any questions pertaining to emergency lighting systems.*

1. Is it permissible to use the same wires, conduits, boxes, sockets, etc., for both A.C. and D.C. currents, providing an automatic throwover switch is interposed between the two sources of current, so that only one supply will be used at a time?

Yes, providing the wiring is installed in a manner approved for both A.C. and D.C. It is, of course, understood that this is for lighting systems only using incandescent lamps.

2. Could we use the same layout as before, but using different wires for the D.C., also different sockets, but attached to the same fixture, it is

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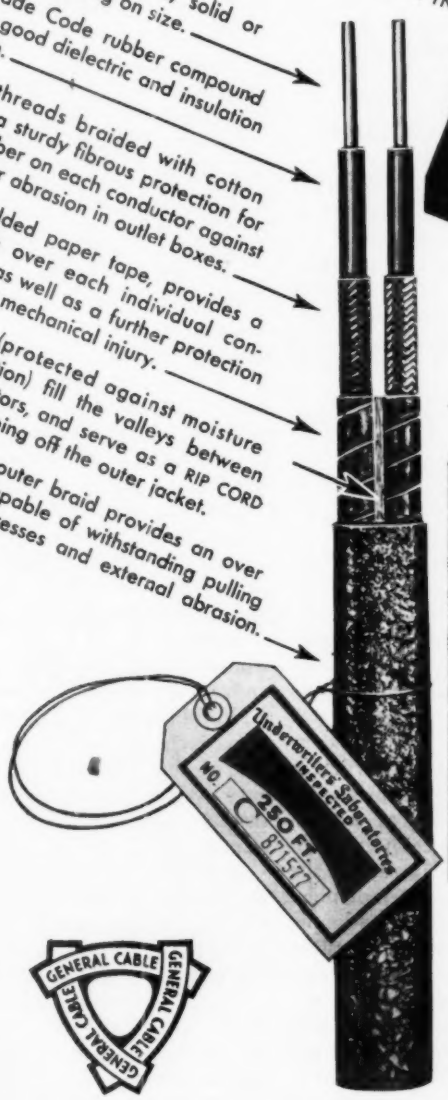
- Fillers (protected against moisture absorption) fill the valleys between conductors, and serve as a RIP CORD in stripping off the outer jacket.
- Tough outer braid provides an over coat capable of withstanding pulling —in stresses and external abrasion.



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THE greater the efficiency of the tools you use, the more chance you have for meeting competition and for making a profit on each job. That is where Greenlee Conduit Benders and Knockout Tools come in. They cut costs on every job where they are used.

Hydraulic Conduit Benders

Greenlee Hydraulic Conduit Benders insure profits because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire. They are easy to take to the job, too, because they are portable.

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Greenlee Knockout Punches and Cutters make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

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2-34

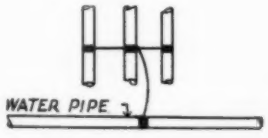
understood, of course that the automatic switch is still being used?

If an automatic throwover switch was employed, this arrangement would be allowed, although it would not be required.

If, however, the emergency lighting is apt to be used on one supply system at the same time that the other lighting is used on the regular supply system, then the wires are not to be run in the same conduits nor in the same boxes or cabinets unless separated from the others by means of a substantial barrier. This applies to raceways also. Sockets on the same fixture could be supplied from both systems providing the wires for each system were kept in separate wireways on the fixtures.

GROUNDING TO SECONDARY NEUTRAL GRIDS

What is meant in 901-b (1931 Code) by secondary neutral grid? (This is in case a water pipe is not available for making the ground.) Does this mean that if the secondary system is not grounded inside the building (where a conduit could be grounded to it), that a wire must be run from the building to the pole, and tapped on the neutral grounded wire as shown below?



Why couldn't the pipe be grounded to this same wire in the house (marked with a cross) and save an extra wire?

The best definition of "Secondary Neutral Grid" appears in Article 1 of the Code and is as follows: "A well grounded network of neutral conductors formed by connecting together within a given area, all the neutral conductors of individual transformer secondaries of the supply system." Many utilities have established such neutral grids in their territories but, of course, they are not to be used to provide grounding except where water pipe grounds are not available. It would not be necessary to run a grounding conductor from the house conduit back to the transformer to effect grounding. The conduit can be grounded to the neutral wire at the service. Of course, in this case, the neutral conductor would have to be of sufficient size to satisfy the rules for grounding conductor size.

PULL BOX OR AUXILIARY GUTTER?

Would you consider a large pull box an auxiliary gutter? One that would have to be made up special?

A large pull box situated, as many are, over a switchboard and used to "supplement the wiring spaces at a switchboard" would be an auxiliary gutter.

CURRENT IN COMMON NEUTRAL

What size neutral is required for the following circuits:

3-2 wire circuits on 3 phase 4 wire.
6-2 wire circuits on 3 phase 4 wire.
4-2 wire circuits on 2 phase 5 wire.
8-2 wire circuits on 2 phase 5 wire.

When having 6 circuits on one common neutral on 3 phase 4 wire, assuming 15 amp. for each circuit, is the maximum overload the sum of 2 circuits x 1.40 or 42 amp.?

For 3-2 wire 15 amp. branch circuits as described in Section 2005 of the 1933 Code, fed from a 3-phase 4-wire system, 4 No. 14 wires are sufficient. That is, the neutral wire should be No. 14 when the other wires are No. 14.

For 6-2 wire 15 amp. branch circuits supplied from a 3-phase 4-wire system (with 2 circuits to each phase), 30 amp. capacity would be required for the neutral if each circuit is loaded up to 15 amps. This, then, would require No. 8 for the neutral and this set-up would, therefore, have 6 No. 14 and 1 No. 8 wires.

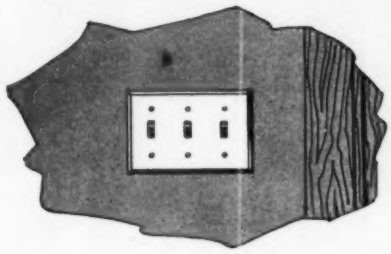
If each circuit had a connected load of but 10 amp. the neutral would have to carry only 20 amp. and in this case a No. 12 wire would be sufficient.

It should be remembered that on the 3-phase 4-wire system, the neutral wire will never carry more current than the maximum flowing over any one of the phase wires.

On a 5-wire 2-phase system the conditions are different and the current value will differ. The greatest load carried by the neutral on such an arrangement where 4-2 wire circuits are used would be where 2 circuits only were in use at one time and each circuit was connected to one side of each phase and the other two

What Price Installation?

HERE ARE THE FIGURES

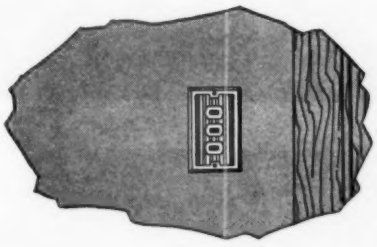


The Old Way

MATERIAL

3—Switch boxes (new work type) @ 19.60	$ .59
3—Single pole switches (cheap type) @ 11.50	.35
1—3 gang plate (Bakelite) @ 21.06	.21

TIME	min.	sec.
Assembling and installing 3 gang box	7 :	15
Installing and aligning 3 separate switches	9 :	04
Installing and aligning 3 gang plate	1 :	02
	17 min. 21 sec. @ 1.00 per hr.	.29
Total Cost		$1.44



The Modern Way

MATERIAL

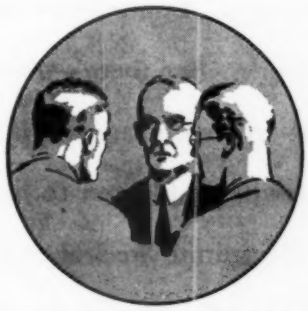
1—Switch box (new work type) @ 19.60	$ .19
3—**P&S-Despard** Single pole switches No. 1311 @ 19.20	.58
1—**P&S-Despard** Single gang plate No. 1333 @ 12.60	.13

TIME	min.	sec.
Installing one gang box	4 :	10
Assembling 3 **P&S-Despard** switches in strap	:	50
Installing and aligning 3 switches as one unit	6 :	00
Installing and aligning one gang plate	:	30
	11 min. 30 sec. @ 1.00 per hr.	.19
Total Cost		$1.09

HERE IS THE ANSWER

COST
The Old Way
$1.44
=
- Cheap type switches.
- A three gang plate on the wall—large and conspicuous.
- Just another wiring job—nothing for Architect, Builder or Home Owner to be proud of.

COST
The Modern Way
$1.09
=
- A specification job—the kind the government requires.
- Space saving—just a one gang plate—neat and inconspicuous—the way wiring devices should be
- You stamp yourself as a wide awake contractor—wiring today's modern home the modern way.



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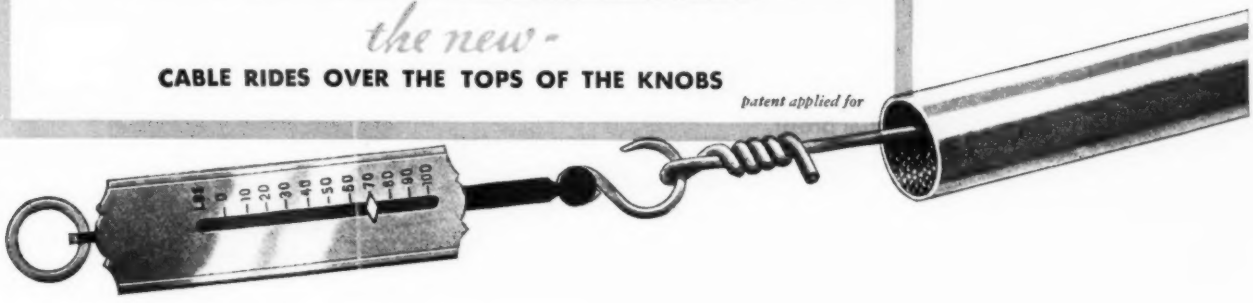

dency to jam. And the saving in time is reflected in increased profits.

Yet, all the old well-known advantages of this modern electric resistance welded electrical metallic tubing are retained—light in weight—perfect mechanical and electrical protection—easy to cut and bend—and no threads to cut. Let us send you a sample of Electrunite Steeltubes—or, better yet, try it on the next job where you have had to figure close. You'll be surprised—and convinced.

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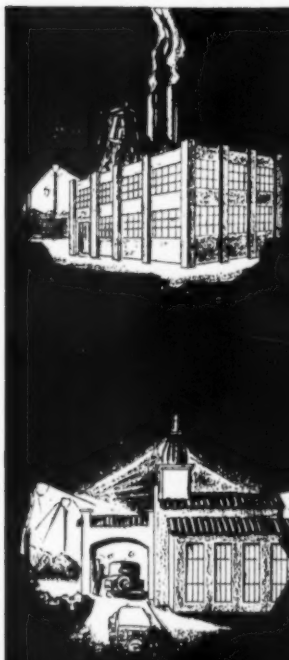

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Glassteel Diffuser—a unit that is ideal for plant and office installations.

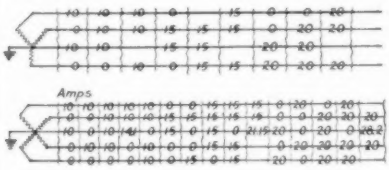
circuits were out of use. With the 15 amp. load on each circuit as above, the common neutral would carry 15 x 1.41 or 21.15 amp. This, therefore, would require a neutral of No. 10 wire.

Were the load but 10 amp. per circuit instead of 15 as in the preceding paragraph, the neutral would have to carry but 10 x 1.41 or 14.1 amp. and a No. 14 wire would be sufficient.

Where 8-2 wire circuits are connected to a 5-wire 2-phase system the maximum neutral current would be

a. for 15 amp. load per circuit $15 \times 2 \times 1.41 = 42.3$ amp. which would require No. 6 wire for the neutral.
b. for 10 amp. load per circuit $10 \times 2 \times 1.41 = 28.2$ amperes, which would require No. 8 wire for the neutral.

Below are given some values of currents in common neutral conductors under conditions mentioned above.



It will be noted that the factor 1.41 is employed only with the 2-phase system and not with the 3-phase system.

FLOW OF CURRENT OVER GROUNDING CONDUCTORS

What is meant in 901-a (1931 Code) by: "Where an objectionable flow of current occurs over a grounding conductor, due to the use of multiple grounds?"

Does this mean where a grounded conduit or BX job touches a gas pipe, metal ceiling, etc., at several places, or where several sections of a metal job is grounded as shown?

The "multiple grounds" referred to does not mean the haphazard "grounds" presented by occasional contacts between armored cables or conduits with gas or water pipes, but where the use of a number of intentional grounding connections causes an objectionable flow of current over the grounding conductors.

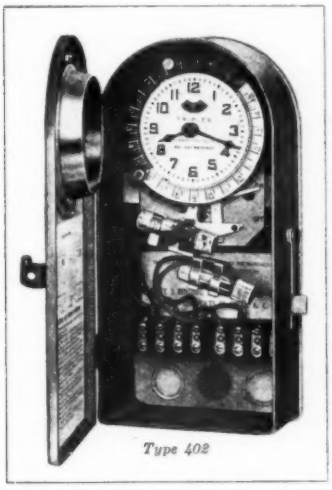
This objectionable flow of current is not a common occurrence but is sometimes encountered in some localities. It is generally, where found, caused by some local condition.

ANNOUNCEMENT

The Mercoid Corporation has taken over the exclusive manufacturing and sales rights of the well known line of Triplex Time Switches formerly sold by the Triplex Products Corporation of New York City. The Mercoid switch as well as other integral parts of Triplex Time Switches have always been of Mercoid make. The synchronous clock mechanism however, will continue to be the same high standard Waltham movement.

The new arrangement is an assurance of combined quality and service to merit your continued patronage. Graybar Electric Company with its nation wide distributing organization as well as other leading electrical wholesalers, are prepared to make immediate deliveries from their stocks.

MERCOID TRIPLEX TIME SWITCHES ARE AVAILABLE IN SEVERAL TYPES TO MEET VARIOUS OPERATING CONDITIONS



Type 402

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Clock Face with silver finished dial. Distinct hands and legible numerals permit quick reading. Seconds indicator rotates while current is on.

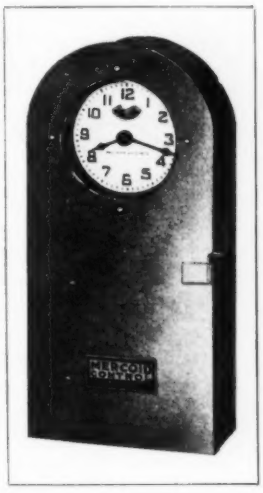
Clock is easily set on time from center thumb screw without loosening "ON" and "OFF" clamps.

The clamps around the 24 hour or 7 day dials for making time settings are all easily adjusted to meet any control requirement. Extra "ON" and "OFF" clamps may be used for additional operations.

The Mercoid hermetically sealed mercury contact tube switches are not affected by dust, dirt or corrosive gases. There can be no open arcing, pitting or oxidation. The contacting surfaces are kept permanently clean and will last indefinitely.

The snap-action switch movement assures positive "on" and "off" positions at all times.

Write For Bulletin 115-TC



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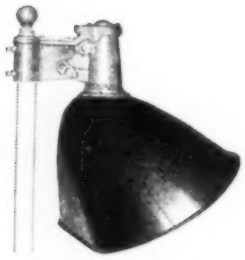
Benjamin "Duo-Service" Floodlight.



Benjamin "Play-Area" Floodlight.

Benjamin "Ellipto-Lite".

Benjamin Enclosed Floodlighting Projector.

FLOODLIGHTING
for Auto Service Stations

Increased registration, growing car sales, reemployment—all point to more income from increased traffic for the auto service station. The new basic codes for the petroleum industry mean greater stability, better profit margins and funds for improvements.

Owners and operators will be in the market for floodlighting as a means of attracting customers to their stations. They will also need reflectors and other fixtures for more efficient lighting of pumps, greasing pits, wash racks, work benches, and the office interior.

Benjamin advertising to oil and gasoline marketers and to the service stations is directing this business to the electrical contractor. Go after this business with Benjamin floodlights and other lighting equipment.

Benjamin lighting equipment has been installed in service stations in every part of the country, giving the highest efficiency in illumination, long life and lasting satisfaction.

These Benjamin floodlights will help you get these service station lighting jobs.

"Duo-Service" Floodlight

The "two-in-one" floodlight. Lights the ground area, drives and approaches, and at the same time illuminates to a higher intensity within or near the lighted area, a building or spot of ground. The two types of light are provided by the large porcelain enameled reflector and an auxiliary high intensity chrome-plated reflector. Uses only one 750, 1000 or 1500-watt Mazda lamp.

"Play-Area" Floodlight

An open type, wide angle, diffusing floodlight with a reflecting surface of special diffusing porcelain enamel in combination with an inner reflector of oxidized aluminum. A distinctive design that results in high efficiency illumination and improved control of light. Very appropriate for many station and ground area layouts. Uses only one 750, 1000, or 1500-watt Mazda lamp.

"Ellipto-Lite"

Another open-type, wide angle diffusing floodlight for use with 300 to 500-watt lamps and combining an elliptical shaped porcelain enameled reflector with an inner auxiliary reflector of oxidized aluminum. Particularly suited for floodlighting smaller types of service station building and ground area. Hood construction makes possible easy removal of reflector for cleaning without disturbing the socket or wiring. Hoods in two types—pendant for attaching to threaded pipe, or with universal mounting bracket to flat surfaces, or by means of pipe clamp to 1" and 1½" pipe.

Enclosed Floodlighting Projector

For longer range high-intensity floodlighting of station buildings, producing more conspicuous contrasts and providing color effects. Spread of beam of light may be varied through a wide range, and light may also be directed upward or downward. *Heavy aluminum case. Polished crystal mirror reflector. Removable, weather-tight, heat-resisting cover glasses can be had in four colors. Uses 250 to 1500-watt Mazda lamps.

Benjamin Electric

General Office and Plant:

Divisional Sales Offices:

BENJAMIN FLOODLIGHTS

BUSINESS NOW!

SIGN LIGHTING

for Outdoor Advertising

Outdoor advertising—poster panels, bulletin boards, roof and wall signs, ridge and transom signs, emblem signs and painted boards, are increasing in number, every day, everywhere.

New signs are going up. Old signs are being repaired and repainted. The advantages of a well lighted sign are being appreciated more and more.

Benjamin sign reflectors are made for the job. For each type of sign there is a distinct shape—each is designed to give complete and uniform coverage without scallops or shadows. High illuminating efficiency, sharp cut-off at top, minimum spillage at bottom, easy wiring, good appearance and long life.

Benjamin advertising to sign makers and sign users is selling the idea of lighted signs. These Benjamin sign reflectors will help you get sign lighting jobs.

Benjamin "Master" Sign Reflector.

Benjamin "Emblem" Reflector.

Benjamin "Bulletin" Reflector.

Benjamin "Portable" Floodlight.

"Master" Sign Reflector

The old reliable. Accepted as standard by the sign industry for lighting poster panels, bulletin boards, roof signs and wall signs. Easily installed. Gives uniform illumination over the entire board. Minimum spillage over top. No scallops nor shadows. Porcelain enameled steel. Neat, inconspicuous on the sign in daytime. Heavy weather-proof fitting. Conduit goes straight from sign to reflector. Uses 100, 150 and 200-watt lamps.

"Bulletin" Reflector

A fine addition to the line of Benjamin sign reflectors. Meets a decided need for the adequate lighting of certain types of signs. Adapted particularly for the lighting of small rectangular signs; long, narrow ridge and transom signs and the like. Porcelain enameled steel reflector. Wide distribution, with sharp cut-off at top and minimum spill at the bottom. Removable threaded aluminum cap for easy wiring. Made for 50 to 100-watt lamps.

"Emblem" Reflector

For the lighting of Emblem and other small circular signs. Used particularly about gasoline filling stations and auto service stations. Porcelain enameled steel reflector. Defines sign sharply, without spillage or glare. Removable threaded aluminum cap makes wiring easy and cuts down installation time. For use with 50 to 100-watt lamps.

Portable Floodlight

Very useful where a projected beam is desirable. Avoids glare on painted boards. Focusing adjustment that varies beam spread from 25 degrees to 60 degrees. Non-tarnishing, polished aluminum alloy reflector. Completely adjustable. Removable, weather-tight, heat-resisting glass cover can be had in four colors. Sizes for 150 to 500-watt lamps.

Manufacturing Company

Des Plaines, Illinois

New York Chicago San Francisco

BENJAMIN REFLECTORS

TRADE MARK

N.E.C.A.
NEWS AND SERVICE INFORMATION

MATERIAL FOR THIS DEPARTMENT IS SUPPLIED BY THE HEADQUARTERS STAFF OF THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK, N. Y.

President, L. E. Mayer
14 North Franklin Street, Chicago, Illinois

Vice President, Earl N. Peak
1603 West Main Street, Marshalltown, Iowa

DIVISIONAL EXECUTIVE COMMITEEMEN

Eastern
Louis Kalischer
288 Livingston St.
Brooklyn, N. Y.

Southern
D. B. Clayton
844 Martin Bldg.
Birmingham, Ala.

Southeastern
W. W. Ingalls
315 S. W. 10th Ave.
Miami, Florida

Great Lakes
R. J. Nickles
109 W. Main St.
Madison, Wis.

Central
F. T. Langford
511 S. Third St.
Minneapolis, Minn.

Mountain
R. R. Reid
1957 South 5th East
Salt Lake City, U.

Pacific
F. O. Sievers
468 5th St.
San Francisco, Cal.

Eastern Canadian
R. A. L. Gray
85 York Street
Toronto, Ont.

Western Canadian
J. H. Schumacher
344 Main Street
Winnipeg, Man.

At Large
E. D. Brown
2470 Grand River Ave.
Detroit, Mich.

A. C. Brueckmann
314 Keyser Bldg.
Baltimore, Md.

J. A. Fowler
118 Monroe Ave.
Memphis, Tenn.

H. B. Frazer
250 N. 11th St.
Philadelphia, Pa.

G. M. Sanborn
309 N. Illinois St.
Indianapolis, Ind.

W. J. Squire
401 Wyandotte St.
Kansas City, Mo.

General Manager
Laurence W. Davis
420 Lexington Ave.
New York City

Contractors Organized for Industry Welfare

ASKS DEALER PROTECTION IN UTILITY CODE

At the January 12 public hearing on the proposed NRA code for the electric light and power industry the National Electrical Contractors Association through General Manager Davis objected to certain portions of that code, asking for clarification and introduction of paragraphs to protect the electrical contractor and dealer industry.

It was asked that the definition of the electric light and power industry be amended so that it could not be construed to refer to electrical installation within the property of private owners or on the customer's side of the meter.

The power companies' proposed code contains a provision excepting from the code part-time employees who work in part for others or for themselves in other trades or industries. The NE.C.A. asked that this provision be either stricken out or fully clarified so as not to permit employees of power companies who may be engaged part of their time in competing with electrical contractors being employed under this clause, to compete unfairly with other regular and full-time employees of a utility company.

The N.E.C.A. pointed out the practices which have developed within the power industry in the matter of merchandising, taking particular exception to the free-lamp renewal policy of certain companies. The utility code contains a section which reads "It is the duty of members of the industry to promote the use of electric service in the public interest and to that end electrical appliances are promoted, sold, or otherwise made available to customers."

The N.E.C.A. asked that a further section be added to read in substance as follows:

"It shall be an unfair trade practice for any member of the industry to furnish to consumers of electric current, wiring installations on the customers' side of the meter, or electrical appliances, lamps, or other utilization equipment at less than the true cost of such services or equipment, including installation and distribution costs, and no part of such cost shall be absorbed as promotional expense for the sale of electric current."

Wherever appliances appear in the power companies' code the association has recommended the words "and lamps" be added in order to protect the contractors and dealers against the unfair competition of free lamp renewals.

NEW N.E.C.A. CHAPTERS

Jackson Electrical Contractors Association covering jurisdiction of the City of Jackson, Mississippi, to be known as Jackson, Miss., Chapter. Stuart C. Irby, 230 E. Capitol Street, Jackson, Mississippi, President.

Electrical Contractors Association of Syracuse covering jurisdiction of Onondago, Oswego, Jefferson, Oneida, Cortland, Broom and Cayuga Counties, N. Y., to be known as Syracuse Chapter. F. P. Edinger, 944 West Genesee Street, Syracuse, New York, President.

Electrical Contractors Association covering the jurisdiction of interest of its membership in Greater New York to be known as New York (No. 1) Chapter, John L. Flagg, 140 Cedar Street, New York, N. Y., President.

NEW MEMBERS

The following applicants have been accepted into the N.E.C.A. since the publication of the list in the January issue.

NEW JERSEY

Jersey City:
Castro & Cousins Co., Inc.

OREGON

Portland:
Cruson Electric Co.
Davidson Electric Co.
Linn & Yeager
Sanders Electric Co.
Sprague Electric Co.
Standard Electric Co., Inc.
Telco Electric Co.

PENNSYLVANIA

Pittsburgh:
Babitt Electric Co.
Saul Segall
Jesse Stone

TENNESSEE

Chattanooga:
Colston Electric Co.
H. C. Hennessee Electric Co.
C. O. Stanley
Stanton Electrical Service

WISCONSIN

Milwaukee:
A. C. Electric, Inc.
F. L. Schauz Electric Company
Simpson & Beyer Electric Co.

UMI

SANGAMO
TIME-SWITCHES•

200 Electrical Wholesalers Must Be Right!

• YOU CAN DEPEND ON THEM FOR THESE JOBS !

Here are 16 markets where contractors can sell SANGAMO Time-Switches at 2 profits—a time-switch and a wiring job profit as well.

1. Oil burner control
2. Ice machine defrosting
3. Apartment house lighting control
4. Beacon lighting control
5. Floodlighting control
6. Airport lighting control
7. Traffic lighting control
8. Billboard lighting control
9. Electric sign control
10. Ventilation control
11. Display window lighting control
12. Poultry house lighting control
13. Blower operation control
14. Automatic stoker control
15. Motor control
16. Oil filter control

Your suppliers—more than 200 of them—stock and sell SANGAMO Time-Switches. Your wholesalers are right—SANGAMOS are too—they had to be. Your wholesalers investigated the Sangamo Line of Time-Switches before accepting them for you. They found that Sangamo's 30 years of precision instrument manufacture guarantees your entire satisfaction with SANGAMO Time-Switches.

Why not be certain of SANGAMO dependability and accuracy of operation yourself? Ask your wholesaler to show you a SANGAMO Time-Switch for any and all time-switch jobs. Depend on your wholesaler and SANGAMO Time-Switches. You'll be right, too.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

UMI

CONTRACTING news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO THIS DEPARTMENT

PLANS FOR NEW ASSOCIATION ABANDONED

The organization of another national association of electrical contractors which was being promoted by some union shop employers has been abandoned, it was announced by one of the organizers to a group of fifty or more electrical contractors from different sections of the country who had met in the Washington Hotel, Washington, D. C., following the open hearing on January 22 on the independent code for the electrical construction industry. This meeting was conducted by L. E. Mayer, president, National Electrical Contractors Association and chairman of its code committee, for the purpose of answering questions relative to the code and its administration.

Before the meeting came to a close Mr. Mayer announced that he had just learned of the plans to organize another national association and stated that he felt it was an unwise and unfortunate move to make at this time when industry solidarity was essential to securing a code of fair competition.

A. C. Brueckmann of Baltimore, a member of the executive committee, N. E. C. A., and one of the new association organization committee, stated that the new group had been projected when it did not look as though the N. E. C. A. and the I. B. E. W. would get together to straighten out their code differences. Now that this has been accomplished, Mr. Brueckmann stated, there was no longer any necessity for the new association and all plans for promoting it had been abandoned.

The questions asked at this meeting about the code related chiefly to its administration. Considerable interest was manifested as to how the local administration was to be set up and operated.

ILLINOIS INSPECTORS DISCUSS REINSPECTION PLAN

At the annual meeting of the Illinois Chapter, Western Section, International Association of Electrical Inspectors, held at Hotel Sherman, Chicago, January 25 and 26, the entire afternoon of the first day was given over to the consideration of the report of the committee on reinspection of residences and dwelling properties which was presented by its chairman, Charles K. Cregier, chief electrical inspector of the city of Chicago.

The report, which was preliminary in nature for the purpose of creating discussion and securing suggestion, suggested a plan whereby the city inspection department in each community would undertake a reinspection survey of all residential properties, pointing out the defects to the owners but without attempting to exercise any police powers. It was suggested that the utilities might lend support to the movement through publicity in connection with the light bills.

It developed in the discussion that the inspectors generally were in favor of some workable plan of reinspection but they were divided on their ability to gain admittance to homes. It was apparent that this difficulty existed largely in the city of Chicago, especially with flat and apartment house buildings, the inspectors in communities of single-family dwellings sensing no difficulty in this direction.

It was apparent that all of those present were of the opinion that to accomplish the most in such an activity wide-spread publicity was necessary.

The committee was instructed to bring in a further report at the June meeting of the Chapter.

L. E. Mayer, president National Electrical Contractors Association, aroused considerable interest in his presentation of the Code of Fair Competition for the Electrical Construction Industry. A committee was instructed to work out plans for securing legislation making the National Electrical Code a State Code for Illinois in order to take advantage of that section of the contractors' code making it mandatory for contractors to install work in accordance with local regulations.

Other speakers on the program were Tracy E. Johntz, General Electric Company, Chicago, "Practical Application of Electron Tubes"; William A. Jackson, deputy commissioner of department of streets and electricity, Chicago, "Relationship Between the Contractor, the Manufacturer and the Public"; Victor H. Tousley, electrical field engineer, N. F. P. A., Chicago, "Recent Changes in National Electrical Code"; Norman K. Laird, bureau of electrical inspection, Chicago, "Inspection and Construction of Electric Signs"; and John M. Stewart, chief electrician, McCormick Works, International Harvester Company, "What Electrical Inspection Means to the Large Industrial Plant."

STATE-WIDE REINSPECTION PLANNED

A proposal for employing C.W.A. funds to finance a state-wide reinspection survey in Minnesota employing idle electrical men has been held up pending the issuance of new funds to the government unemployment aid.

The Minnesota plan which had been worked out in detail was to be undertaken by counties and had as its purpose a survey of the wiring and electrical devices in every building in towns or cities of 500 or more population.

The project started with A. P. Peterson, former field man for the N.E.C.A. and now federal engineer with the state C.W.A. It had the approval of the state engineer, state

Explosion-Proof Panelboards
For Hazardous Locations

Type GUB Panelboard Condulet

Type FLP Panelboard

Explosion-Proof Panelboards are intended for use in Hazardous Areas, and are carefully designed to comply with the exacting requirements of the Underwriters' Laboratories for such locations.

Type GUB Explosion-Proof Panelboard Condulets are made in the two-circuit size only, and are furnished complete with a terminal board and take two single pole circuit breakers of from 15 to 35 amperes capacity.

Type FLP Explosion-Proof Panelboards consist of ready-wired assemblies of circuit breakers in explosion-proof housings. They are made in the four, six, and eight circuit sizes; and are furnished complete with single or double pole circuit breakers of from 15 to 35 amperes capacity.

Catalog sent upon request.

CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NRA WE DO OUR PART NEMA CODE

CH580

IF YOU WERE IN THE "Red" LAST YEAR . .

IF at any time during 1933 your business showed a loss or was low in profit, here's some advice which has helped other contractors, and may mean a change from red figures to black for you—use Fretz-Moon Conduit. • Why? Because this modernly-made rigid steel conduit offers advantages found in no other make, and costs less to install. • Fretz-Moon Conduit is made from specially-rolled steel strip by Fretz-Moon's exclusive continuous process of manufacture. The metal retains all of its original ductility and uniformity—"burnt" or hard spots are never present—every length is uniform from one end to the other—bending, cutting, threading and wire-pulling are easier, faster and less expensive. • By using Fretz-Moon Conduit you can bid as you ordinarily would, and what you save in labor cost and time on the job will help to increase your profits. • Give Fretz-Moon Conduit a fair trial on your next half-dozen jobs —then judge for yourself.

STEEL AND TUBES, INC.
CLEVELAND • OHIO
EXCLUSIVE SALES AGENTS

FRETZ-MOON

Rigid conduit

fire marshal and the municipal departments of the three largest cities in the state, Minneapolis, St. Paul and Duluth.

The entire project, it was thought, would employ 717 skilled electrical workers and 56 semi-skilled workers, for approximately eight weeks. At this rate it was estimated that 140,000 buildings, less than one-third of the wired buildings in the state, would be reinspected. The skilled workers were to be taken from unemployed electrical engineers, electrical workers and electrical contractors now registered with C.W.A.

RED SEAL THE GOAL IN DENVER MODERNIZING CAMPAIGN

Modernization is to be featured for the first time in Denver's annual "clean-up; paint-up" campaign. The Electrical League of Colorado has been working with the general committee to endeavor to bring all wiring jobs in this campaign up to the Red Seal Standard.

Several model homes will be exhibited to show what can be accomplished by modernization while the Electri-News which goes to thousands of users of electric service will carry a pictorial exhibit of twenty methods of modernizing electrically.

CUSTOMER CLASSIFICATION IN FIXTURE CODE

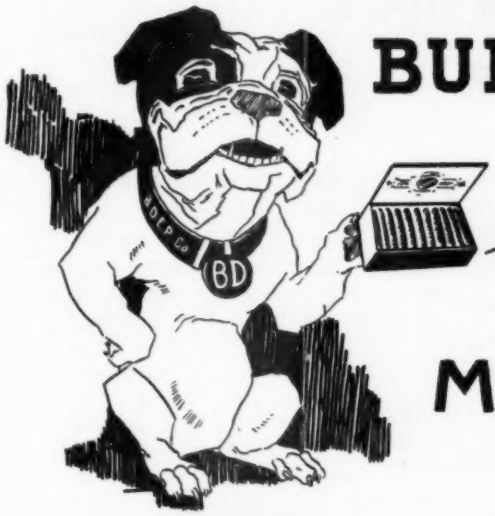
Definite classification of customers with discount schedules for each, terms of payment and other conditions of sale as a part of a uniform selling plan for any specified products are proposed in the supplemental code of fair competition for the lighting equipment manufacturers, hearing which was set for January 26. It is proposed that such a uniform selling plan be put in practice when it has been endorsed by at least 75 per cent of the production volume of the products involved.

The supplemental code also contains provisions for charges to be made on all lighting fixture projects of $1,000 and over for all engineering and designing service where sketches, designs and layouts are required and furnished.

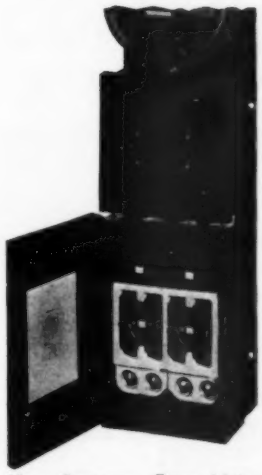
Lump sum bids are not to be permitted except the bidder shows unit prices on all articles in the schedule. The practice of contracting for sale

A BLESSED EVENT!

(That even Walter never suspected)



BULL DOG *announces the addition of a complete line of* METER SERVICE SWITCHES



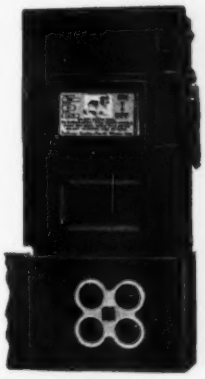
New Sequence Type Meter Test Cabinet with Combined Service Switch, Range Switch and Lighting Cabinet.

Electrical Contractors, as a class, don't waste much time talking. They have a Job to do and they want the kind of wiring materials that can be installed quickly and economically and that will give good service to their customers, after it is installed.

On this basis, we believe they have always accorded approval to BULL DOG Industrial Switches, Panelboards and Switchboards.

And so we feel confident that this addition of a more complete line of Meter Service Equipment, will prove of interest, as we expect it to prove of service, to them. For it will simplify the Contractor's purchasing problem and enable him to make complete and uniform BULL DOG installations.

Tell your Jobber you want to make it a complete BULL DOG Job!



4 Circuit Fuse Cabinet Combined with 30 Amp. Meter Test Switch.

Closed view showing Interlocked Fuse Compartment 60 Amp. Accessible Fuse Type Meter Switch.

Switch-Meter-Fuse Sequence showing Switch in "Off" position and Fuses accessible.

BULLDOG ELECTRIC PRODUCTS CO.

DETROIT MICH. U.S.A.

NEW PYLE-O-FLEX

flexible explosion-proof fitting

ADAPTED to hazardous location installations in Class I, Group D, and Class II, Group G, and for the many other wiring installations where a watertight and vaportight flexible connection is desirable.

FLEXIBLE: eliminates bending and fitting of rigid conduit in crowded spaces, saving time and avoiding trouble.

BETTER INSTALLATIONS: simpler, easier to install, safe, and economical.

EXPLOSION-PROOF: every Pyle-O-Flex fitting is tested for leaks at fifty pounds air pressure, and is capable of withstanding 500 lbs. hydrostatic pressure.

WATERTIGHT: substantial, non-corrosive brass and bronze construction throughout.

PERFECT GROUNDING: Pyle-O-Flex is continuous with the rigid conduit system giving a low-resistance ground circuit.

LISTED by the Underwriters' Laboratories for use in Class I, Group D, and Class II, Group G hazardous locations as referred to in Sec. 3203, Par. C, Article 32 of the 1933 National Electrical Code.

Ask your Jobber, or write for bulletin with complete description, tables of standard lengths, and list of applications.

The PYLE-NATIONAL COMPANY
1334-58 North Kostner Avenue
Chicago, Illinois

SEND FOR DESCRIPTIVE BULLETIN NOW » »

The Pyle-National Company
1334 North Kostner Ave.,
Chicago, Illinois

Send me bulletin on
Pyle-O-Flex Explosion-Proof
Flexible Conduit Fitting

Name.....
Street.....
City.....

in large quantities and shipping in small quantities is frowned on except the supplier receives compensation for the increased cost of split shipments.

Other practices that are banned are design piracy, bid peddling, unfair bid rejection, consignment stocks, advertising allowance, threats of suit, splitting of commissions, substitution of materials, return of merchandise after a period of thirty days.

MINNESOTA TO HOLD LARGE STATE MEETING

The Minnesota Electrical Association will hold its sixth annual meeting in conjunction with the Minnesota Electrical Council on February 22 at Faribault, Minn. Because of NRA code matters and industry relation problems this is expected to be the largest gathering of electrical contractors ever held in the state. A large attendance of manufacturer, wholesaler and utility representatives is also expected.

THIRTIETH ANNUAL DINNER AND DANCE

The thirtieth annual dinner and dance of the Independent Electrical Contractors Association, Inc., was held at the Hotel Astor, New York City, on January 17. This meeting at which the newly elected officers are installed has come to be one of the large annual affairs at which every branch of the electrical industry is represented.

KANSAS CITY CHAPTER ELECTS OFFICERS

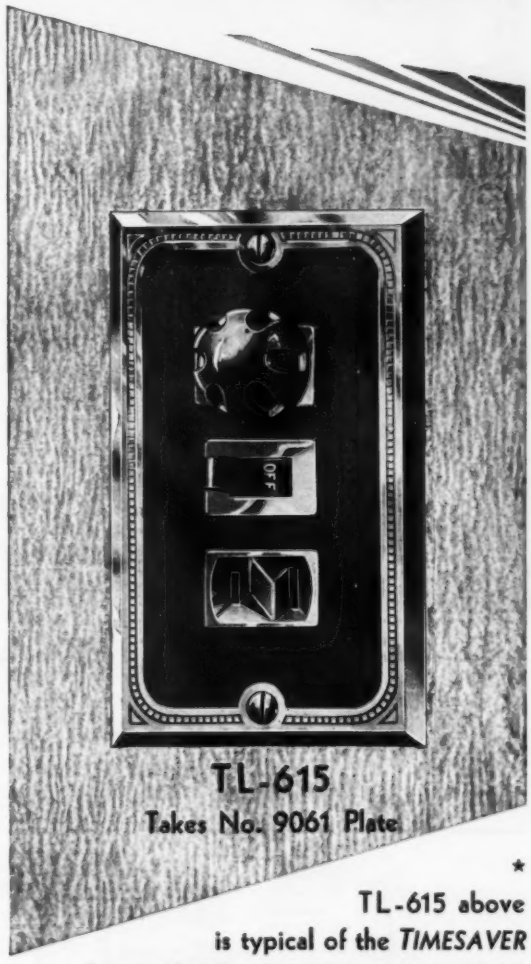
The Kansas City Chapter of National Electrical Contractors Association has elected the following officers for 1934: L. G. Schumacher, president; J. C. Murray, vice-president; Fred Geiss, secretary; and E. L. Fickie, treasurer. The directors are the officers and G. G. Burkholder, G. V. Dameron and B. R. Nelson.

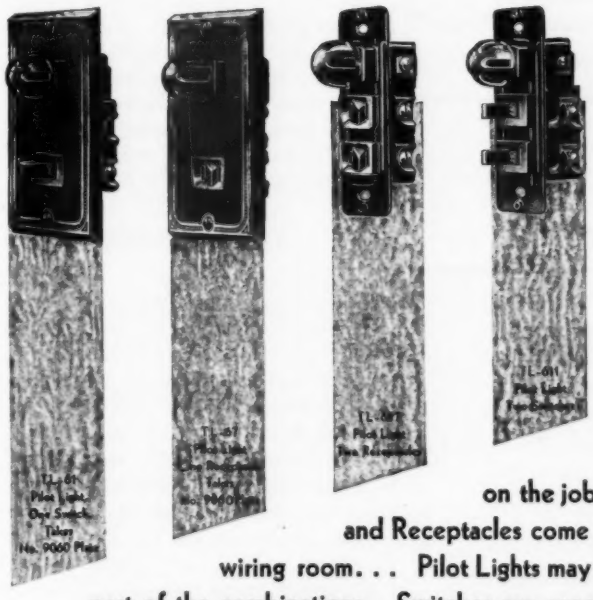
ELECTRICAL SAFETY DISPLAY IN ROTARY EXHIBIT

At the Business Recovery Exhibit held by the Rotary Club of Chicago in January the Kelso-Burnett Electric Company aroused considerable public interest in its display of electrical fire and casualty hazards and

H&H TIMESAVER LINE

Switch, Receptacle, Pilot Light *COMBINATIONS*





★

TL-615 above is typical of the *TIMESAVER* Line of COMPLETELY ASSEMBLED COMBINATIONS—all made up, ready to install on the job. All required arrangements of Pilot Lights, Switches and Receptacles come in small, one-piece Bakelite bases affording generous wiring room. . . Pilot Lights may be wired to work with either the *switch* or *receptacle* part of the combinations. Switches are especially designed for modern Type C lamp loads. All combinations fit *standard* switch boxes. . . With this line you buy only the combinations you need for the particular job in hand. Write for illustrated 4-page folder describing COMPLETE line, with instructions for ordering. » » » » » » » » »

HART & HEGEMAN DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

PORTABLES
that meet every requirement

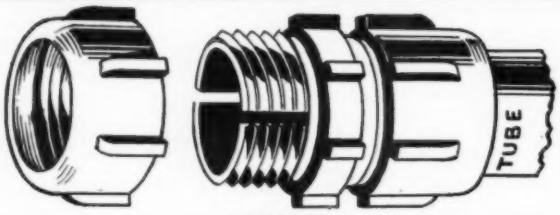
The eight portable lamp guards pictured here present only a portion of the extensive McGill portable guard line.

McGill Portables designed to meet every imaginable need, bring directed and protected light to every job and every worker.

McGill Portables perform a multiple duty; they guard light bulbs against breakage, and guard workers from the danger of serious injury. They protect workers from strain due to improper lighting conditions, and protect your invested dollars against unnecessary losses... Write for our interesting catalog describing the entire McGill line of portable lamp guards.

McGILL MANUFACTURING CO.
Electrical Specialties of Quality
ESTABLISHED 1904
VALPARAISO · INDIANA
Box No. 670

NEW
Threadless Fittings
for Thin Wall Conduit



Patent Pending

Threadless Couplings and Connectors for Thin Wall Conduit.
Only 3 Parts—Simple to install.
Body has straight threads and each end is slotted over which taper Threaded Nuts, tightened to depress the slotted prongs, securely clamp the pipe.
Made of Malleable Iron. Nicely Cadmium Plated.

Ask your local wholesaler or write direct to us.

THE STERLING MFG. CO.
STRATFORD, CONN.
Makers of "Sterling" Quality Fittings
APPROVED BY UNDERWRITERS' LABORATORIES

their effects. The display which was in chart form with exhibits of actual devices which had caused accidents was developed with the cooperation of the city electrical inspection department.

SQUIRES NEW CHIEF INSPECTOR N. Y. BOARD

F. N. M. Squires, who for the past seven years has conducted the Code Chats section in ELECTRICAL CONTRACTING, has been promoted from assistant to chief inspector of the bureau of electricity of the New York Board of Fire Underwriters.

P. Ferneding who has been chief inspector succeeds J. C. Forsyth as supervising engineer, the latter becoming consulting engineer for the bureau.

DENVER TO PROMOTE LIGHTED GARDEN ACTIVITY

The Denver Rocky Mountain News will sponsor this spring throughout Colorado with the endorsement and support of a large number of garden clubs and women's organizations of the State a garden contest with a separate classification for lighted gardens and grounds.

In announcing this contest the Electrical League of Colorado states that it has even greater possibilities than the Christmas lighting program which has been very successful in Denver.

ELECT OFFICERS

The Wyoming Valley Electrical Contractors Association at its January 16 organization meeting elected John H. Schmidt, Wilkes-Barre, president; Joseph Janoski, Nanticoke, vice-president; and G. E. Shepherd, Wilkes-Barre, secretary-treasurer.

Application was also made to the National Electrical Contractors Association for a local charter, and a request was forwarded for the appointment of a local code administration and enforcement committee.

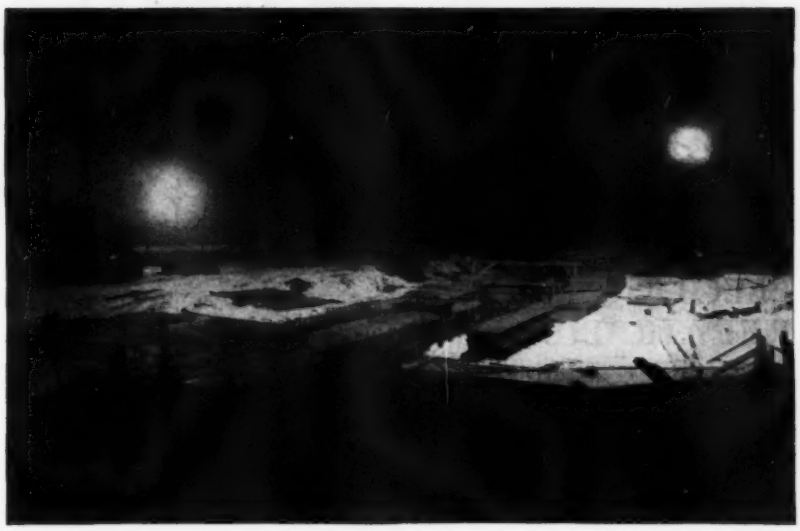
MUNICIPAL SIGNAL MEN HEAR ABOUT EXPLOSION-PROOF WIRING

At the meeting of the New Jersey Municipal Signal Association held at Ridgewood on January 18, W. H. Flandreau of the Appleton Electric Company delivered a paper on "Explosion-Proof Wiring."

There's Profit for You in Floodlighting Construction Jobs

A low-cost, aluminum G-E Novalux floodlighting projector, suitable for temporary installations

A copper-bronze floodlighting projector, ideal for permanent installations



EACH new construction job means a possible floodlighting installation. The opportunities are tremendous, for already the money appropriated for federal and non-federal construction projects is approaching the three-billion-dollar mark.

Floodlighting is a necessity for many jobs, and a paying proposition on many more. It makes possible work at night, when conditions, particularly as to traffic, are sometimes more favorable than during the day. It adds to the safety of work that is carried on after dusk. It is the surest, cheapest method of minimizing the loss from theft of equipment and materials at night. It provides a method of advertising that can be equalled in no other way.

Have you investigated the possibilities for floodlighting installations? Remember that every installation requires collateral material, such as lamps, wire, cable, switches, and poles, and a certain amount of direct labor. It is not the floodlights alone that bring the profits; in some cases, the cost of these other materials and of labor far exceeds that of the floodlights themselves. When you estimate the value of floodlighting, consider also the value of accessory materials and of labor.

General Electric engineers will gladly help you solve problems you may meet in unusual or complicated applications, or answer questions which may arise in the course of any installation. Address the nearest office of the G-E Supply Corporation; any other G-E Merchandise Distributor; any G-E Sales Office; or General Electric, Schenectady, N. Y.

YEAR-AROUND POSSIBILITIES FOR FLOODLIGHTING

Buildings • Factories and Industrial Areas • Construction Work • Parking Areas • Gasoline Service Stations • Outdoor Sports, Winter and Summer • Playgrounds • Swimming Pools and Beaches • Residences, Grounds, and Gardens • Fairs, Pageants, and Race Tracks • Signs, Billboards, and Advertising Displays • Farm Buildings and Yards • Roadside Stands • Natural Scenery in Parks and Estates.

500-87

GENERAL ELECTRIC

NOW- how to repair and rewind all types of motors...

ELECTRIC MOTOR REPAIR LIBRARY

4 volumes, $10.00, payable in easy monthly installments

THIS set of books should be on the shelf of every man who ever has to touch a motor for purposes of repairing it or changing it to meet different operating conditions. In shop language and with practical shop methods it covers every step in stripping, rewinding and connecting a.c. and d.c. motors of all kinds.

Do you know how to:

—lay out a wave winding
—test a.c. and d.c. motors to locate grounds, shorts, opens, quickly and positively
—properly record data when stripping armatures so that it will be instantly usable for correct rewinding by yourself or any experienced winder at any time afterward
—determine how many coils can safely be cut out
—lay out single-phase fan motor windings
—change single-phase windings for two- or three-phase operation
—make cross or equalizer connections on lap windings
—lay out frog-leg windings
—handle every step in a rewinding job from the time it comes into the shop until it leaves
—wind stators for turbogenerators
—band high-speed armatures
—rewind motors for voltage, speed, frequency, or cycle changes
—etc., etc., etc.

1,079 pages of practical shop methods and data on jobs like these in this library. A complete, up-to-date key to repair of all motors. Nothing else in it; every page filled with definite, practical facts for the industrial maintenance man and the electric shop worker.

How to change motors for different operating conditions

Here is all the information you need in order to determine what changes various types of motors permit; to lay out new windings for specified service conditions; and to handle every step in the work with satisfactory results.

Covers all types of motors, from those used in small household and commercial appliances of all kinds, to mining and railway motors. Explains principles underlying the different types of windings; gives definite instructions for doing the various rewinding jobs. Also gives many data, tables and diagrams constantly needed by the repair man, including data difficult to get from any other sources.

Low price—easy terms—10 days' examination on approval

Bought separately the books in this Library would cost you $11. By using this coupon you need pay only $2.00 in 10 days and $2.00 monthly until the special price of $10.00 is paid. In addition, we give you 10 days in which to examine the books. Send no money; simply fill in and mail the coupon now; let us know your answer after you have seen the books.

McGraw-Hill Book Co., Inc.,
330 W. 42nd St., N. Y. C.

Send Electric Motor Repair Library for 10 days' examination on approval. In 10 days I will send $2.00, plus few cents postage, and $2.00 monthly for four months, or return books postpaid. (We pay postage on orders accompanied by remittance of first installment.)

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(Books sent on approval in U. S. and Canada only.)

NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

MERCOID CORPORATION TAKES OVER TRIPLEX TIME SWITCH

Triplex time switches, formerly sold by the Triplex Products Corporation of New York City, are now being manufactured and sold by The Mercoid Corporation of Chicago, Ill.

The clock movement, however, will continue to be of Waltham make.

R. F. Fisher, who was sales manager of Triplex time switches for the Triplex Products Corporation is now with The Mercoid Corporation as one of its vice-presidents in charge of sales.

The Mercoid Corporation manufactures a complete line of automatic controls for pressure, temperature and vacuum used on heating, refrigeration, air conditioning and industrial applications.

Graybar Electric Co., Boston, Mass., announces the appointment of Francis X. Fitzpatrick sales manager for the New England territory. Mr. Fitzpatrick has been with the Graybar organization for over twenty years.

HEARL APPOINTED SECRETARY OF CREDIT ASSOCIATION

Arthur F. Hearl of the Metropolitan Electrical Supply Co. Chicago, was appointed secretary of the Electrical Credit Association at the midwinter meeting of the board of managers in New York City on January 25, succeeding Colonel Frederick A. Lind, who tendered his resignation as secretary of the association effective January 31.

For years Mr. Hearl was credit manager, treasurer and president of the American Electrical Supply Company, Chicago.

Mr. Hearl also was president of the association from 1927 to 1929, and for several terms served as member of the executive committee of the central division, and since 1924 has been a member of the national board.

GENERAL ELECTRIC SHOWS INCREASE IN 1933 ORDERS OVER 1932

President Gerard Swope of General Electric Co., Schenectady, N. Y., has announced that orders received by the company in 1933 showed a 17 percent increase over 1932. During 1933 orders amounted to $142,770,791 while those in 1932 amounted to $121,725,772.

Orders for the quarter ended December 31 amounted to $37,985,790 as compared with $27,351,658 for the last quarter of 1932, showing an increase of 39 percent.

A wiring guide and chart for ready reference has been published by the Wiremold Company, Hartford, Conn. This chart which contains condensed data on Wiremold products has been issued pending publication of catalog containing complete detailed information on Wiremold items. The inside of the pamphlet shows a complete chart of all Wiremold fittings.

The General Electric Supply Corporation, Denver, Colo., is now located at its new headquarters at 1429 Eighteenth St., Denver.

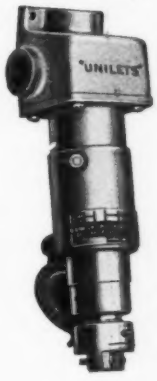
"Spots of Heat for Industrial Plants" is the title of a pamphlet published by General Electric Co., Schenectady, N. Y. The pamphlet contains a miniature movie showing how small heating problems may be overcome.

What "Explosion-Proof" means

"Explosion-proof means enclosed in a case which is designed and constructed to withstand an explosion of a specific gas or dust surrounding the enclosure, by sparks, flashes or explosions of the specified gas or dust which may occur within the enclosure."

From the 1934 National Electrical Code, as defined by Underwriters Laboratories.

"Explosion-Proof" Requirements are met by .. APPLETON *Explosion-Proof* UNILETS



Type "CES" Explosion-Proof Receptacle Equipment Complete with Type "CPH" Plug

Appleton Explosion-Proof Unilets have undergone exhaustive tests and practical usage and meet the explosion-proof requirements of the Underwriters Laboratories. They are made of malleable iron, give thorough protection, are sturdy, and the Cadmium Finish makes them rust resisting.

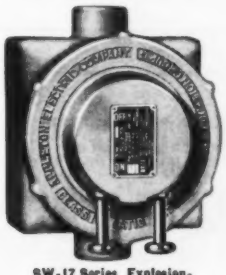
Write for Bulletin 1003 which contains important information on hazardous location wiring and about Appleton Explosion-Proof Unilets. It will be gladly sent to you, without obligation.

APPLETON ELECTRIC COMPANY
1749 Wellington Ave., Chicago, U.S.A.
New York—150 Varick St. Los Angeles—340 Azusa St.
San Francisco—655 Minna St.
St. Louis—420 Frisco Bldg. Detroit—7724 Woodward Ave.

Type "GRUST" Unilet with ½" Union Hubs

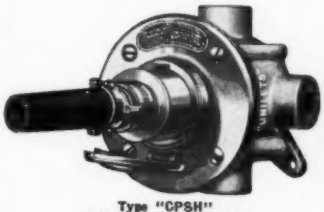
Type "EVAR" Explosion-Proof Lighting Fixture

MDS Series Explosion-Proof Unilets

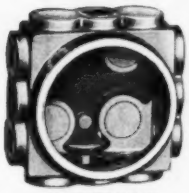


SW-17 Series Explosion-Proof Fitting with Toggle Switches

Type "EVA" Explosion-Proof Lighting Fixture

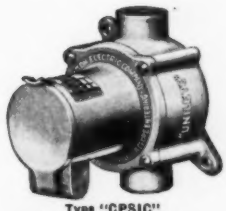


Type "CPSH" Unilet complete with Lift Cover and showing Type "CPP" Plug inserted in Receptacle



Type "GRUJ-2" Unilet with Cover Removed Showing Close-up Plugs in certain Threaded Openings

Type "BFGSC" Explosion-Proof Unilet



Type "CPSIC" Unilet Complete with Lift Cover (Closed)

Type "ERC" Explosion-Proof Unilet—Threaded Hubs

Union Connector

Type "EFSC" Motor Control Push Button Station

Type "EGK" Unilet with Interlocking Type Safety Switch, Plug Receptacle and Type "EGK" Plug Installed

APPLETON *Explosion-Proof* UNILETS

Reg. U. S. Pat. Off.

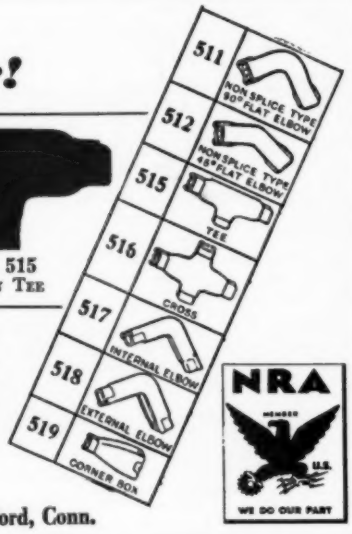
UMI

WIREMOLD
"MONEY MAKERS"

Here's another!

This famous tee is the answer to "fussy" customers!

No. 515
PLAIN TEE



LIKE all Wiremold Fittings, it is so neat, so inconspicuous, that the prospect always says, "Just what I want—put it in!" Get acquainted with these famous fittings. Make the most of them.

NRA
MEMBER
U.S.
WE DO OUR PART

THE WIREMOLD COMPANY, Hartford, Conn.

BURNDY
QIKLUG

Just like that..!

BURNDY
ENGINEERING CO., INC.
305 EAST 45TH STREET, NEW YORK

Bright Light Reflector Co., 100 White St., Brooklyn, N. Y., has just released Catalog No. 34 covering Silv-A-King commercial and industrial reflectors. Catalog is illustrated and contains new designs recently incorporated into the line of products manufactured by the company. In addition the catalog contains prices, illumination charts and accessories used in connection with installation of reflectors.

Frank V. Burton, manufacturers' agent located at 1600 Arch St., Philadelphia, Pa., announces that Frank B. Chapman has become affiliated with his office, and a partnership formed to be known as Burton & Chapman.

Both Mr. Burton and Mr. Chapman were for many years connected with the Bryant Electric Company. Later Mr. Burton became sales manager of Weber Electric Co. and Mr. Chapman was on the sales staff of Harvey Hubbell, Inc.

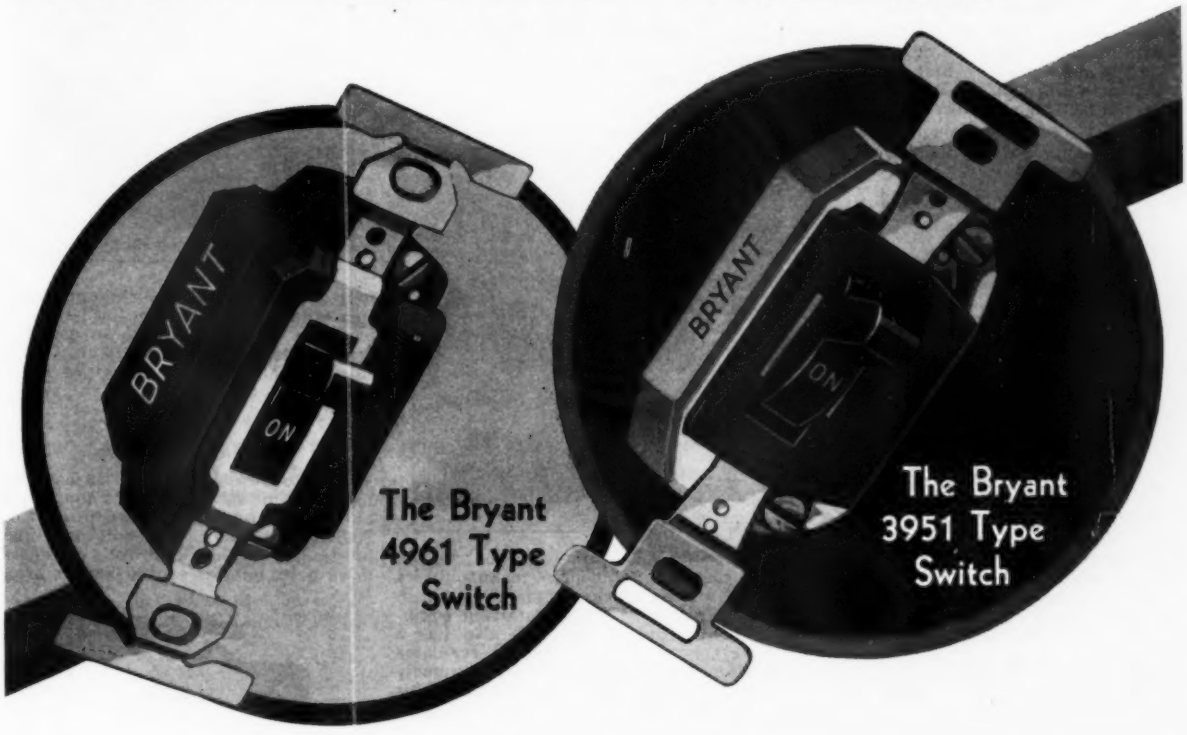
Bulletin EM-4, effective October 25, 1933, has been published by Johnson Bronze Co., New Castle, Pa. The bulletin covers Johnson phosphor bronze electric motor service bushings which are listed alphabetically. The list contains Johnson part number, manufacturer's number, size and make of motor, type of motor and frame or model.

Universal Motor Co., Oshkosh, Wis., has issued a bulletin on its line of standardized power electric plants, containing description and illustrations of the different units and a specification sheet. A price-list is also enclosed and a small pamphlet covering Universal marine electric plants in 2, 4 or 6 cylinder models.

A 4-page leaflet on Trenchlay Cable covering power type, concentric type, control type and railway signal type has just been released by General Cable Corporation, New York City.

Diamond Chain & Manufacturing Co., Indianapolis, Ind., announces the appointment of Rodney Davis, 624 Race St., Philadelphia, Pa., distributor for Diamond roller chains, sprockets, couplings and special chains in the Philadelphia district.

To Insure Trouble-Free Performance *Install* BRYANT *Switches*



STANDARDIZE
ON
BRYANT
Superior Wiring Devices

SWITCHES
RECEPTACLES
SOCKETS
CUT-OUTS
FUSES

A complete line that covers every installation requirement

BACKED by over forty years' experience in the manufacture of superior wiring devices The Bryant Electric Co. has developed two distinct types of flush tumbler switches which cover a wide range of installation requirements. Each type is accurately designed and carefully manufactured. Both types offer the utmost in lasting service and trouble-free operation.

Outstanding in performance the Bryant 4961 Type Switch affords ample protection to the severe operating conditions existing in Type C circuits. The mechanism is totally enclosed and the binding screws are large, making for easy installation.

The Bryant 3951 Type Switch was developed to meet the demand for a high quality inexpensive switch which would permit savings in installation costs wherever a shallow box was necessary.

For further information see your Bryant Distributor or write to The Bryant Electric Co., Bridgeport, Conn.

BRYANT *Superior Wiring Devices*
Manufactured by THE BRYANT ELECTRIC CO., Bridgeport, Conn.
MANUFACTURERS OF "SUPERIOR WIRING DEVICES" SINCE 1888 . . . MANUFACTURERS OF HEMCO PRODUCTS
NEW YORK 60 East 42nd Street | CHICAGO 844 West Adams Street | SAN FRANCISCO 149 New Montgomery Street

UMI

February New Products

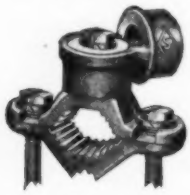
Range Receptacle

A 60-amp., 250-volt range receptacle with Bakelite cover of modernistic design is announced by Bull Dog Electric Products Co., Detroit, Mich. Receptacle has contact jaws reinforced by tempered

steel springs for positive contact; solderless cable connectors; improved universal cable clamp and knockouts permitting installation from beneath, through floor or from back, through wall. Flange of cable clamp is large enough to cover either size K.O. Receptacle can be furnished equipped with grounding contacts for connection with grounding clips of polarized range plugs. Unit is furnished in black but it can be furnished in a variety of colors.

Rigid Ground Fittings

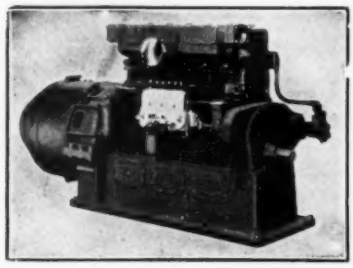
H. B. Sherman Mfg. Co., Battle Creek, Mich., announces a line of rigid ground fittings as follows: GF-1, a solderless fitting with brass washer. With this fitting ground wire is laid



into hub of casting, held in place by heavy screw and brass washer. Screws do not have to be removed from clamp section as "U" shaped slots allow two sections to come apart when bolts are loosened. Lower section may be reversed to give tight contact on ground rod. GF-2, a fitting with soldering lug. This fitting is identical to GF-1, but has a soldering lug installed in fitting in place of brass washer. Tong diameter of lug is narrow so that ground wire may be soldered into lug and lug slipped through threaded portion of fitting. GF-3 fitting with soldering lug is designed for bare copper wire No. 8 to No. 4 B & S. Lug and clamp are identical to those in GF-2. GF-5 fitting is made with heavy cast brass soldering lug which allows a soldered or solderless connection. GF-7 fitting is designed for installing No. 6 or No. 8 bare armored or unarmored ground wire, and may also be used with cables or cord. Pipe clamp jaws are slotted so that clamping screws need not be removed for installation.

Generating Set

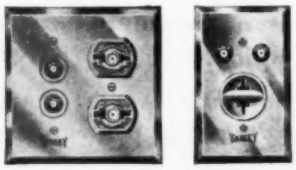
The Buda Co., Harvey, Ill., announces a light compact 6 cylinder Diesel generating set ranging in size from 10 to 90 kw., a.c. and d.c. Unit operates on a 4-stroke cycle principle, is of compressorless construction and has a special



designed head known as the "shock absorber head" which manufacturers claim softens shocks commonly found in Diesel engines. Electric starting equipment is provided and unit also has a governor as well as manual regulator making it possible to maintain extremely close speed regulation so that variations in load do not affect voltages of generator.

Radio Convenience Outlets

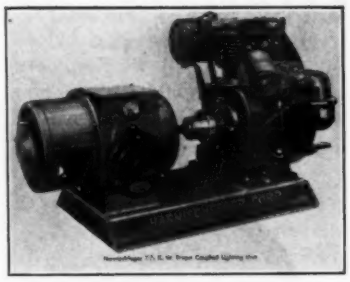
A bakelite two-gang outlet for antenna and ground and duplex electrical connections known as No. 256-B is announced by the Yaxley Manufacturing Co., Division of P. R. Mallory & Co., Indianapolis, Ind. It is furnished com-



plete with two tip plugs and is especially popular for houses and apartments. A bakelite single gang outlet for aerial and ground and electrical connections has also been announced by the company known as No. A-133-B. This plug is mounted on an outlet box which is equipped with built-in separator. Two tip plugs are included.

Portable Lighting Plants

A line of portable lighting plants has been developed by the Harnischfeger Corporation, Milwaukee, Wis. The small heavy duty line of lighting units consists of a one or two cylinder gasoline engine directly coupled to a compound wound continuous generator. Push button or manual starting is available. Capacities range from 400 watts to 3 k.w. generating 35 or 120 volts d.c. Greater capacities are provided for by



four and six cylinder gasoline generator sets with a current range of 1½ to 60 k.w. In addition to these gasoline driven sets, Diesel power is also available and are built in capacities of 35 and 50 k.w., a.c. or d.c.

Ceiling Drive Base

The Rockwood ceiling drive base for mounting motors overhead is announced by The Rockwood Manufacturing Co., Indianapolis, Ind. This unit is similar in design to the Rockwood standard drive base, but has special hanger arms

which carry the motor horizontally. The arms have auxiliary adjusting screws to simplify installation and adjustment of motor relative to pivot shaft. In this drive the weight of the motor which is lightly cradled in the belt automatically maintains the belt tension, and the pivoted motor adjusts itself to changing belt length.

Panelboard

A nofuze circuit breaker lighting panelboard has been announced by the Switch & Panel Division of Square D Company, Detroit, Mich. While unit is

standard in all operating features, the front of the trim is finished in academy brown and inside of the door and barriers are golden wheat tan, giving a two-tone effect when door is open. Interior is walnut Bakelite, while unit operating handles are orange plaskon.

UMI

TRUMBULL SWITCHES IN CAST IRON BOXES

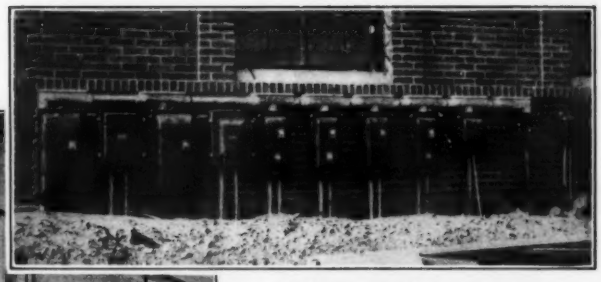
Dust-tight and weather-proof

Type "R.B."
In Cast Iron Boxes
30-600 Amp.
230 & 575 V.A.C.
2, 3 Pole
Fusible and No Fuse

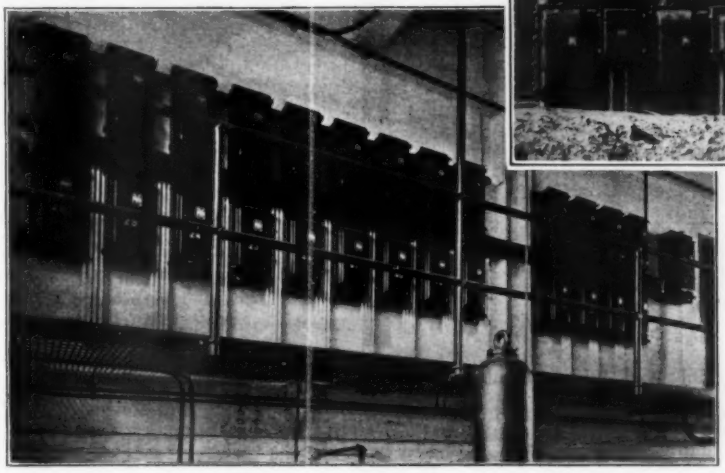
Trumbull Cast Iron Boxes provided with Velumoid gasket around the inside edge of the cover. Cover held to case with heavy bolts and wing nuts. Use of wing nuts makes possible equal tightening of the cover on all sides.

The Trumbull "RB" heavy duty switches enclosed in these heavy cast iron, dust-tight—and weather-proof cases are equipped with

"Vystipe" Fuse Clamps which are a guarantee against trouble, danger and expense caused by fuse heating.



Outdoor installation of Trumbull Cast Iron Switches in a station of a Pipe Line Company.



Installation of Trumbull Cast Iron Switches in a Centrifuge Room of a large Oil Company.

THE TRUMBULL ELECTRIC MANUFACTURING CO.

PLAINVILLE CONN.

A GENERAL ELECTRIC ORGANIZATION

February New Products

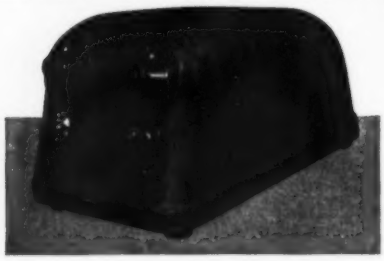
Coil Winding Machine

Ideal Commutator Dresser Co., Sycamore, Ill., announces a coil winder for making motor, armature, field and transformer coils with diamond, round, square or rectangular cores. The coil winding machine is flexible and set-up

from one type of coil to any other type can be made in a few minutes. Having no solid sidewalls, each layer of field or transformer coils can be laced with tape so when machine is collapsed, coil needs no tying to keep it from springing apart. Diamond coils are made in series of any number up to eight, eliminating series connections in pole groups. The machine is light, quickly adjustable, adaptable to most any shape and size of coil and has no wearing parts. Form tubes are instantly removable from finished coils and face plate is easily fitted to any lathe head.

Code Signaling Machine

Automatic Electric Co., Chicago, Ill., has placed on the market a code call sending machine known as the "Autelco" and being merchandised by American Automatic Electric Sales Co., 1033



West Van Buren St., Chicago. Unit is completely self-contained and housed in an aluminum case having a black "crackle" finish. It is furnished with either one or two dials having capacities of 10 and 81 codes respectively and is equipped with rubber-covered cord with special plug and jack for plugging-in to 110-volt a.c. or d.c. lighting circuit. Dimensions are 9½x6½x5½ in. Unit weighs 14 lbs.

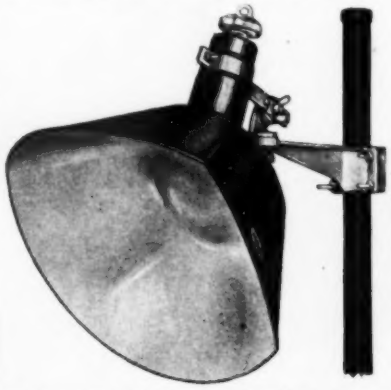
Plunger-Type Relays

A complete line of instantaneous and time delay plunger-type relays for protection against overcurrent and undervoltage, and for use as auxiliary relays, is announced by General Electric Co.,

Schenectady, N. Y. Relays are all single-pole and include a variety of adjustments and convertible features. Instantaneous overcurrent relay can be changed from time delay on contact opening, contact closing, or both, by placing a poppet in the proper hole. Likewise, by turning a cap, the air intake or out-take to bellows can be regulated to change time delay in opening or closing of contacts. Bellows are made of super-aging rubber which does not require lubrication. Other features are changing of hand-reset to self-reset contacts and from circuit opening contacts to circuit closing contacts. The same principle of operation is common to the entire line and depends upon action of a magnet coil in attracting or releasing a plunger when predetermined values of voltage or current are present in coil circuit.

Open Type Floodlight

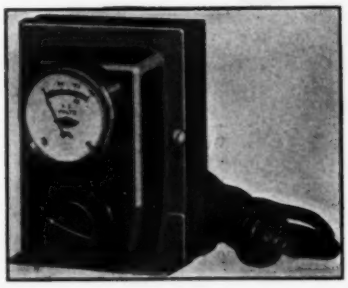
A porcelain enameled open type floodlight is being marketed by Bright Light Reflector Co., Brooklyn, N. Y. Reflector is of heavy gauge metal, finished inside and out in porcelain enamel; bracket arm is of heavy cast aluminum



with swivel joints for adjusting to any position desired; all screws, bolts and nuts are cadmium plated; cap is of cast iron cadmium plated with porcelain insulating bushings. Unit also has a two-piece type porcelain socket with Mogul base.

Variable-Voltage Adjustor

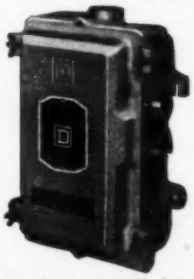
A variable-voltage adjustor is being manufactured by The Acme Electric Manufacturing Co., Cleveland, Ohio, to regulate and adjust the primary line voltage from either below or above normal to the proper operating voltage of the electrical product. Unit is built similar in construction and appearance to a step-down transformer, a series of taps being created within the case. A manually operated dial provides the necessary regulating medium for control and a



sensitive and accurate instrument indicates the secondary voltage in connection with regulation from the operating dial. Because of its regulating feature it may be used both as a step-up transformer as well as a step-down transformer.

Cast Iron Enclosures

A line of switches in dust-tight and weatherproof cast iron enclosures, augmenting the line of 50,000 compact switches, is announced by the Switch & Panel Division of Square D Company, Detroit, Mich. Cast iron switches have the same features as the 50,000 series



in standard sheet metal boxes, quick make and break, interlock and easily removable base which is elevated from back of box to permit wiring under base. The line is available immediately in 30 and 60-amp. and will shortly be manufactured in 100 and 200-amp. sizes. The line also includes 2 and 3-pole, 3-wire and 4-wire solid neutral and 3-wire switched neutral fusible and not fusible in both low and high voltage.

Fusetrons

The Buss fusetron manufactured by the Bussmann Mfg. Co., St. Louis, Mo., meets the need for a device for protecting small motors against burnout due to overloading or single phasing and eliminating needless shutdowns that occur

when fuses blow on starting currents. Fusetron is a thermal cutout to which a fuse is added and gives the same short circuit and line protection as fuses. In addition it gives the same overload and single phasing protection as thermal cutouts and overload relays. Unit is made in 125, 250 and 600 volt sizes and from 1/10 to 10 amp. and will fit in standard fuse clips.

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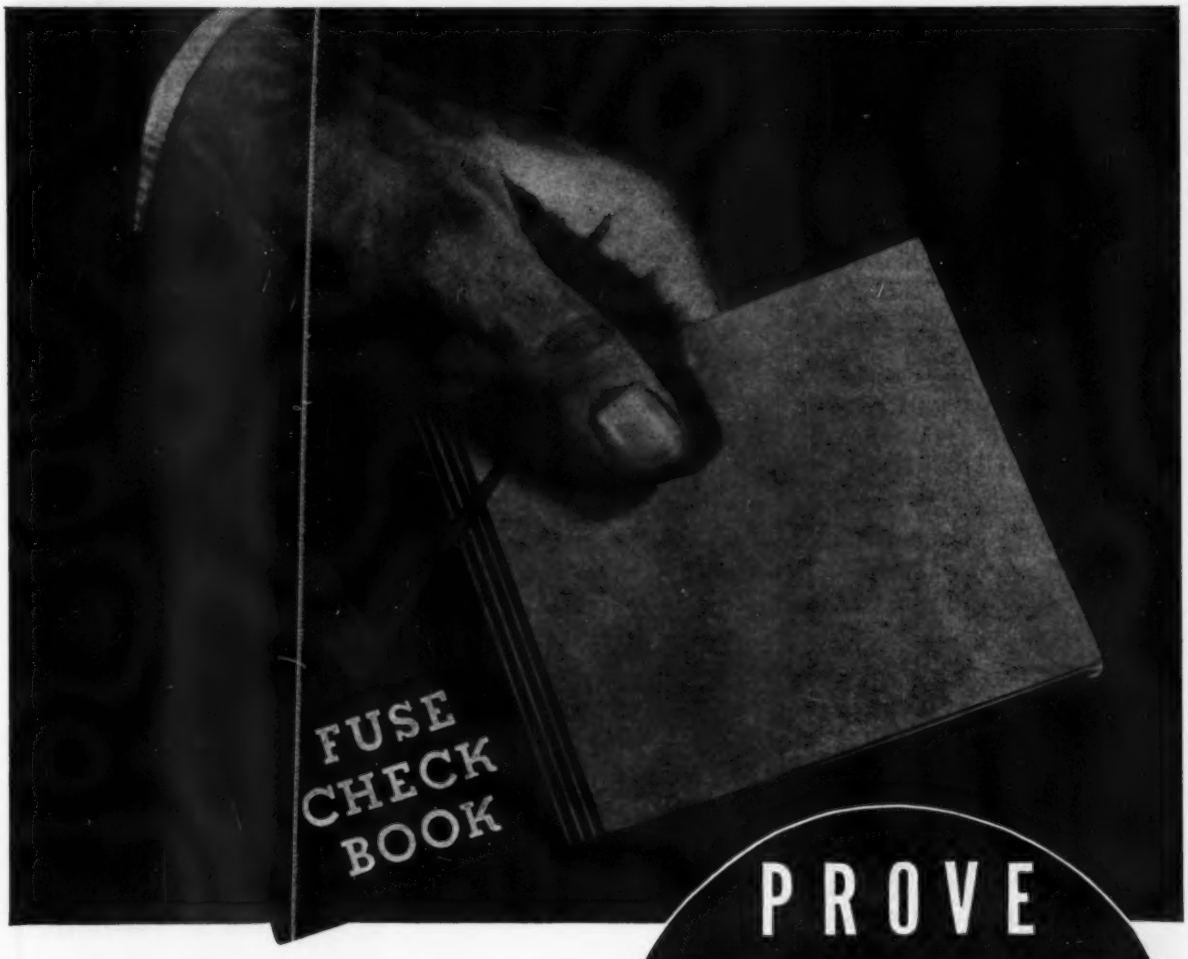

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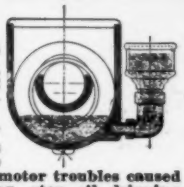

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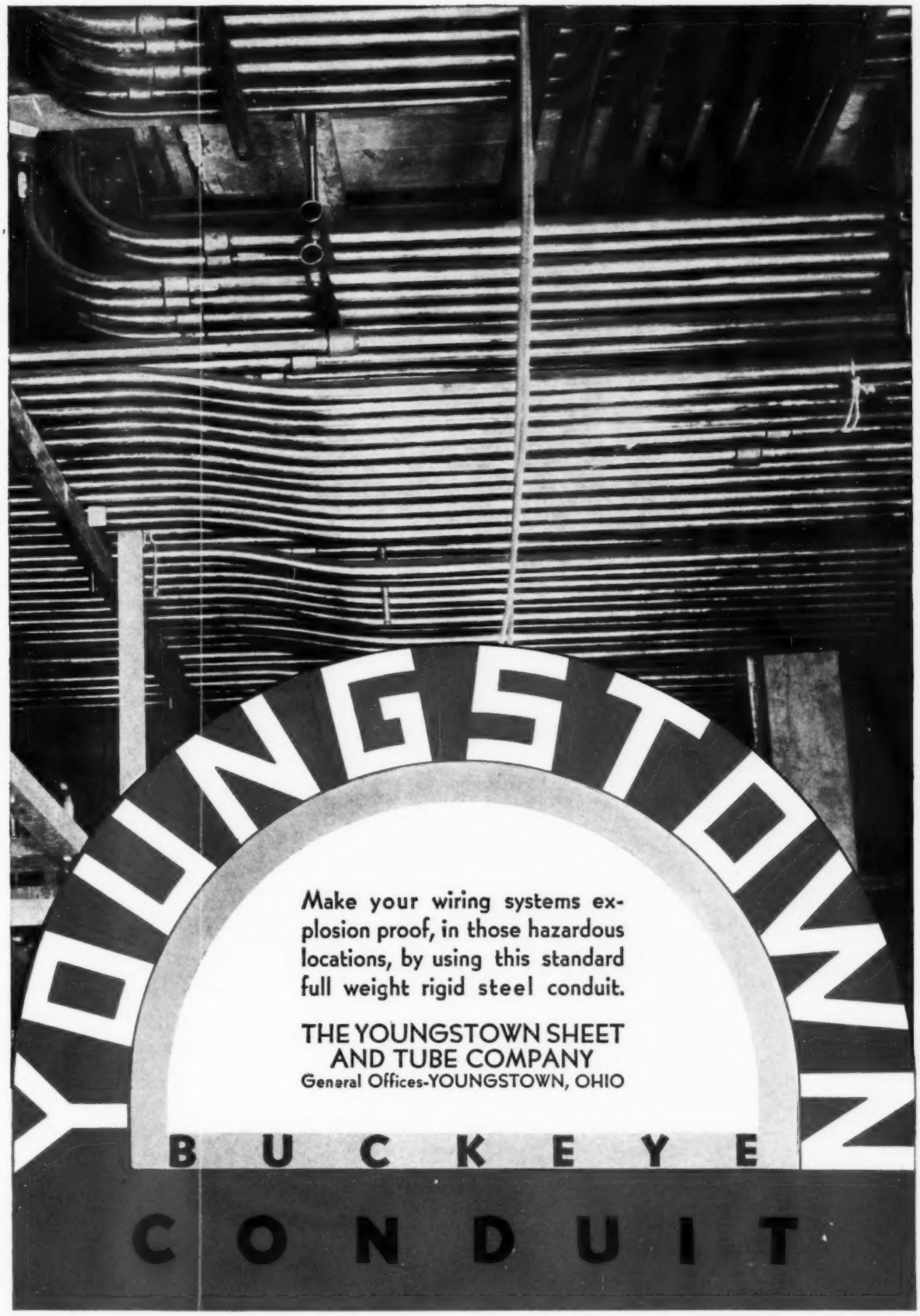
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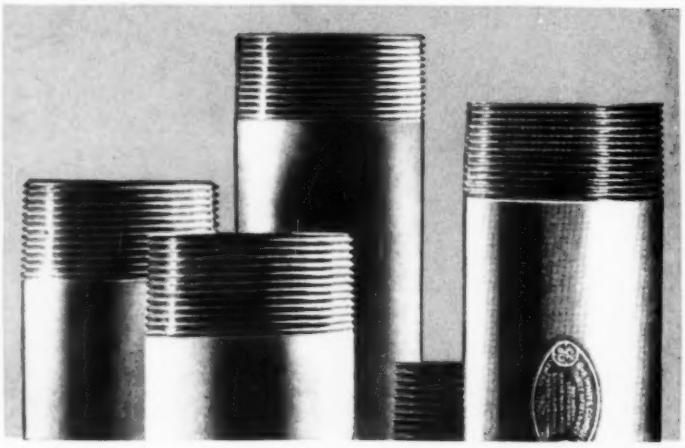

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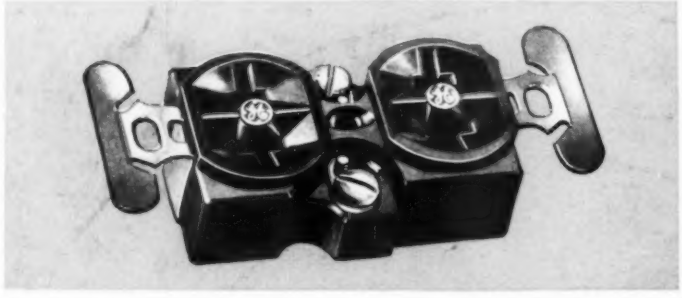

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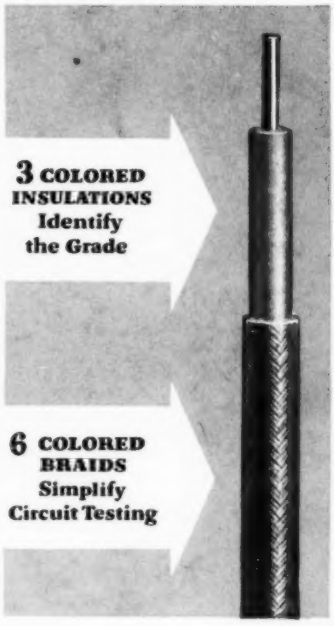

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